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TREATISE

ON

PULMONARY

CONSUMPTION;

ITS

PREVENTION AND REMEDY.

"A wild unwonted brilliancy—
"The lovely but delusive ray."

BY JOHN MURRAY,

F.S.A. F.L.S. F.H.S. F.G.S.

MEMBER OF THE METEOROLOGICAL SOCIETY OF LONDON, AND OF THE WERNERIAN SOCIETY OF EDINBURGH; 'HONORARY MEMBER' OF THE MEDICO-CHIRURGICAL SOCIETY OF HULL, OF THE MEDICAL SOCIETY OF INVERNESS, OF THE PHILOSOPHICAL SOCIETIES OF SHEFFIELD AND HULL; AND OF THE MECHANICS' INSTITUTES OF EXETER, DEVONPORT, PORTSMOUTH, AND BRISTOL; CORRESPONDING MEMBER OF THE NORTHERN INSTITUTION, THE HORTICULTURAL SOCIETY OF EDINBURGH, &c. &c.

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TO

HIS GRACE

THE DUKE OF WELLINGTON,

&c. &c. &c. &c.

My Lord Duke,

I have presumed the honour to inscribe your Grace's name on my little volume, not by way of an Imprimatur, but in reference to a question that verges on national interest, and therefore one to which your Grace cannot be insensible; it affects the annual mortality of upwards of Sixty Thousand, for the most part the beautiful and the best of Britain's Isle.

A rational hope may now be indulged that what has been called the *Tabes Anglica* will at length succumb under the triumphs of medical art, and this dark blot be finally removed from the escutcheon of medicine. It will be found to be the result of the most rigorous induction, and that the priority of having first suggested and employed aerial chlorine in Pulmonary Phthisis is entirely mine.

I hope therefore, my Lord Duke, I may without the charge of presumption indulge the assurance of forgiveness, while it affords me the opportunity of expressing my admiration of your Grace's transcendant talents, and the wish that you may long adorn your distinguished and exalted station.

I have the honour to be,

My Lord Duke,

Your Grace's very humble and

Most obedient Servant,

THE AUTHOR.

Hull, 1st July, 1830.

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ADVERTISEMENT.

"With step as noiseless as the summer air,
"Who comes in beautiful decay? Her eyes
"Dissolving with a feverish glow of light;
"———————————— and on
"Her cheek a rosy tint, as if the tip
"Of beauty's finger faintly press'd it there.
"Alas! CONSUMPTION is her name."

WE have ventured in the following pages to submit to the medical world some considerations on the cure and prevention of Pulmonary Consumption, in the firm belief that this good has been achieved: there is nothing empirical in the case, but the plan proposed is based on the solid principles of inductive truth. The ratiocination seems altogether indisputable, and the question set at rest by the evidence of fact adduced in its favour,—founded on reasonable deductions and correct analogies. Accident has had no part in this discovery; it is the immediate deduction *ab initio*, we humbly conceive, from the soundest principles of legitimate science. The annual drain on the population of the British empire, in the sacrifice of so many lives, and those generally the worthiest of human nature, and at the most promising age, is appalling; and we could not be insensible to an appeal that has wrung so many bosoms, nor refuse our contributions towards elucidating the cure of a disease that has claimed so many victims to swell the amount of her triumphs,—whose exterminating scourge is increasingly

widening the breach, and thinning the ranks of human nature. The consideration of the subject has been the constant image of our thoughts for the last twelve years, and the principles adopted for our government were, that any remedy to be successful in Pulmonary Consumption must be of a two-fold relation,—the one such as could be brought through the medium of respiration into immediate contact with the inflamed mucous membrane of the lungs, or be there sanative, in reference to tubercles which are forming, or already formed,—and the other, such as might diminish the inflammatory tendency of the circulation, by subduing that action, without reducing the tone and strength of the system; not of course trenching on the general treatment deemed necessary by the attendant medical adviser, as the varied symptoms and constitution of the patient might seem to demand;—the peculiar therapeutic *materiel* being all we ever presumed upon, from not being initiated into the practice of medicine; though that chemist has studied the science to very little purpose who has yet to learn the relative use of his discoveries in MEDICINE, and the kindred sciences of PHARMACY and MATERIA MEDICA. We presume on having discovered an important desideratum, and it is hoped that any merit that may belong to it will be unhesitatingly awarded, that humble tribute being all we claim. The greater part of our means has been expended in the cause of our fellow-creatures. Altered circumstances will prevent us in future from repeating or extending sacrifices consistent with prudence, and the duty claimed by those dependent on us.

The pecuniary sacrifices which we have made from time to time in the cause of philanthropy, by instituting experiments interesting to suffering humanity, have been considerable, and we are not ashamed to confess have even sometimes involved us in temporary difficulties. It is our anxious hope it may be ultimately found that neither our time

has been unprofitably spent, nor that we have altogether lived in vain, only regretting that our limited means have circumscribed the power of doing good.

We do hope that we shall not be accused by the Medical Profession as an officious meddler in a question which is rather exotic to our sphere or pale. If this disease, so formidable in the number of its victims, and pronounced incurable and hopeless by the most distinguished Medical Practitioners,—and we have cited our witnesses to this attestation from among themselves—had been less unpromising, we should not have thought it a legitimate question for us to grapple with. The Physician acknowledges his dependence on the Chemist for the greater proportion of his remedial means, and a generous and noble Profession, which justly boasts of its liberal feeling, will not esteem it at all necessary that we should have previously obtained a *diploma* to be useful and do good. We do confess we feel cheered and happy in the reflection, that even when we have mingled with the clods of the valley, and our name and memory have perished, numbers yet unborn may owe their lives and rescue from suffering to the remedies we have freely promulgated, and which, so far from benefiting their author, have subjected him to much thought and anxiety and many pecuniary sacrifices. This delightful anticipation is enough for us; we cannot reasonably expect any return whatever, nor can any motive for the present publicity be justly attributed, but the wish to do good and benefit our fellow-creatures.

Dr. Cottereau, of Paris, has invented a machine for inhaling Chlorine in Pulmonary Consumption, and one case after another has been submitted to the attention of the Institute.* It is now nearly twelve years since we experienced the

* Sir Charles Scudamore and Dr. James Murray are repeating his experiments in this country.

benefit of Chlorine in our own person in pulmonic disease, and it has been freely communicated to numbers, as well in our public prælections as private intercourse. In promulgating the interesting facts presented to us from time to time, we believed that we only fulfilled a sacred and imperative duty. We might easily adduce, from innumerable sources, conclusive proofs that the first idea of curing Pulmonary Consumption by means of aerial Chlorine *originated with us.* We made no secret of it, and it has been these many years dispersed and diffused over many localities in England, and numbers can at any time be brought forward to attest the fact.

The announcement of a remedy for Consumption, we are quite aware, will draw upon us the severest scrutiny. It has baffled hitherto the medical science of a world, and in every work on medicine we peruse, it is regarded as hopeless, or pronounced as incurable. The title that was written over the couch that enshrined the victims of Consumption seemed to us to be that which was inscribed over the portal of the "Inferno" of Dante—"Lasciate ogni Speranza voi ch' entrate;"—for, however hope might kindle up her visions in the hectic breast, those who could best judge knew there was no remedy. We have thought it both imprudent and unwise to make a fictitious display of appeal to the authors we have consulted—a generous and noble host comprise their ranks. On the continent we have a Vogel, a Murray, a Bolzano, a Laennec, a Lombard, and others; and in Britain who has not heard of an Armstrong, a Young, a Baron, a Hastings, and a Forbes, a Johnson, a Williams, a Stokes, and many more, whose talents and writings reflect honour on their profession and credit on themselves? But alas! while these eminent individuals have written wisely on the pathology and diagnosis of this formidable disease, whenever the topic of cure is discussed, the tone becomes heartless and desponding.

We have in like manner an aversion and reluctance to a

parade of cases, as it would be perfectly inconsistent with our avocations, which are not medical but chemical. We think we do much better in offering merely to the world an honest and faithful exposé of what we believe in our heart will be eventually found both remedial and preventive in reference to a disease the fatality of which is increasing fearfully, and the annual summary of which already amounts to nearly seventy thousand within the limits of the British Isles. We are not foolish enough to suppose that if the lungs are completely destroyed, that they can be created anew, but if the integrity of the lungs is still preserved even when invested with disease, the means recommended, if the *vis medicatrix naturæ* be not paralyzed by venesection, &c. may bring relief and cure even at the ninth hour.

We should be ungrateful were we to omit our special acknowledgments to our much esteemed friend, Richd. Hughes, Esq. Surgeon, of Stafford, to whose kindness we are much indebted, and whose anxiety and readiness to second our endeavours to combat this disease successfully we cannot laud in sufficient terms; we have contented ourselves in quoting verbatim from some of his more recent letters to us as the result of what he has found triumphant in his own immediate practice; and have found none who have entered with the same willingness and disinterested anxiety into our views and plans. The influence of clime and a marine atmosphere we have endeavoured to solve differently from those who have hitherto considered the problem, and the views we have sustained are offered to the public, as far as the *rationale* of the curative means is concerned, as to our own humble apprehension, satisfactory and complete.

This work would have appeared some years ago, but it has been postponed from time to time in the hope of finding some substitute for chlorine that might be equally effective, and not so irritating to the lungs, and we wished moreover that experiment

should determine the question beyond appeal. In the vapour of nitric acid, or red fuming nitrous acid, we have discovered what we were in quest of, while we wished also to obtain the approving opinion of medical gentlemen; and thus, strengthened at every point, might be able to plead for acceptance with better grace and chance of success.

20th July, 1830.

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CHAPTER I.

INTRODUCTION——PULMONARY CONSUMPTION—PREDISPOSING CAUSES—HEREDITARY CONSUMPTION—SYMPTOMS—TUBERCULES, HYDATIDS, &c.——REMEDIES—VENESECTION.

The subject of Phthisis Pulmonalis is a most melancholy one, and there are few families in Great Britain whose history does not record one or more victims: a kind of universality is stamped on this destroyer of the species, which belongs to no other class of diseases, nor are there any exempt from its attacks, for the vicissitude of the seasons may soon sow its germs in the healthiest frame. It allows the individual who is already matured in years to "descend into the grave like a shock of corn fully ripe," while it reserves its ruthless attacks for the "little ones," and those who have entered on the theatre of life adorned with all the garniture of promise, and unfolding pleasing images for futurity, —these are the selected victims of this pitiless invader. Medicine has as yet made no successful stand against its visitations, and has been foiled in every attempt at rescue from the clutches of the grave.

It has been well remarked by Dr. Johnson—"when Phthisis is regularly established it forms one of the most distressing pictures which the human frame exhibits in its progress to corruption! The hectic flush on the cheeks, the vermilion lips, the burning heat in the palms of the hands and soles of the feet, with evening fever, are periodically changed for cold colliquative sweats, hollow, pale, languid countenance, sharpening features, augmented expectoration, and progressive emaciation! Such is the series of heart-rending symptoms which are daily presented to the agonized friends, whose distress is heightened by the never-dying hopes which perpetually spring in the hectic breast! Whether it is that the delicate organization which predisposes to this destructive disease contributes to amiability of temper and sweetness of disposition is doubtful, but certain it is that the malady in question falls in general on the best as well as the loveliest part of creation."* The fairest flowers that decorate this "Valparaiso" are exotics which the vicissitudes of a variable clime will soon blight and destroy—they will not flourish except they be nursed with care and tenderness, for they are as delicate as they are "lovely in their lives." Can it be wondered then, that the rude atmospheres and morbid media into which they are often (alas! reluctantly) dragged, should prove fatal to beings like these! "Oh! wonder no more." Were the curious,

* A Treatise on Derangements, &c. London, 1820. Third Edition, page 18.

complex, and delicate machinery of life once studied or reflected on, it would prove an interdict to these sacrifices of the "firstlings of the flock," that fall.

> "Thick as autumnal leaves that strew the brooks
> "In Val' ombrosa."

Consumption, like the vampire, while it drinks up the vital stream, fans with its wing the hopes that flutter in the hectic breast; the transparent colours that flit on the features like those of the rainbow on the cloud, are equally evanescent, and leave its darkness more deeply shaded. They who are the kindliest and the best it selects for its victims, while it softens the temper to an angel tone, as if it would attenuate that delicate materialism to aërial being, in anticipation of the change it is so soon to assume. Dr. Beddoes observes "that it is known to be almost invariably fatal, not one in many hundreds surviving:" "To Consumption," he continues, "nearly one-fourth part of the deaths in the bills of mortality are to be referred. The disease is seen sometimes to perform an operation nearly the reverse of decimation, leaving alive one or two members only out of a large family." This author mentions one case wherein he was called to the sole survivor of six brothers and sisters; and another individual, the last of his name, the father, mother, two sisters, and brother, having followed in succession to the grave. We know cases of a somewhat similar complexion, and

have been informed that a Reverend Gentleman, in the South of England, has followed to the grave within these twenty-four years no less than twenty-five individuals of one family, who have all died of Consumption. There are now two left alone. Dr. Clark observes—"We have no reason to believe that the physicians of the present day are more successful than their predecessors were ten—nay, twenty centuries ago." He states further that a preventive of Consumption is all that can be expected, "because to cure it is what the present state of our knowledge, and the limited powers of our art scarcely admit of our calculating upon, even in the most favourable cases."* Tubercular Consumption, according to Laennec, is not above the means of cure, but as yet we have no power to do it. Avenbrugger exclaims

"O quantum difficile est dignoscere morbos pulmonum!
"O quantò difficilius curare!"

The chief predisposing cause of Consumption is a neglected cold; coughs, peripneumonies, and other inflammatory disorders, are fertile sources of Phthisis: generally speaking, however, the causes are very varied,—mental depression may take its place among the number—convalescence from acute diseases. The seeds of pulmonary disease are even sometimes sown in the nursery that are to ripen into maturity in

* Essay on the Causes, &c. of Pulmonary Consumption. T. Beddoes, London. Second Edition, 1799, pages 303 and 304.

advancing years,—improper diet, confined air, sedentary habits, over-heated apartments, and want of aerial exposure—transition from heat to cold, especially if the latter be humid—cold and damp feet —in fact, whatever induces *cold,* such as exposure to continued chills or cold currents; and Dr. Beddoes says "the common catarrh may lead to the 'churchyard' cough;"—imperfect and unequal clothing. In many instances the boarding-school is the field where pulmonary diseases spring up and rankle in the system: females are secluded there at the most precarious period of their lives, and when free and generous exercise is so essential to health. There are particular employments which more than others determine pulmonary disease: thus tailors, stone cutters, needle grinders, and those who play on wind instruments. It is needless, however, to trace these sources and causes in minute detail, since the question is too ramified and complex, nor is it at all necessary.

Pulmonary catarrh is doubtless one of the most frequent diseases,—very few pass through the round of the annual seasons without an attack more or less severe, yet though this is a common occurrence there are few diseases less understood. It is generally so slight that the functions are not deranged, and the patient manages his usual concerns as before; indeed, what is termed a cold is esteemed a very trifling matter, and, though the basis of a train of appalling diseases, is too often neglected till it fastens on the vitals, and its expul-

sion becomes at last a very serious affair afterwards with the medical practitioner,—in some individuals, however, the attack is so violent as to threaten life. Pulmonary catarrh is an inflammation of the mucous membrane that lines the bronchia; it is characterized by a redness more or less intense, and especially by a certain thickening of the membrane. This inflammatory action is accompanied in its incipient stage by the secretion of mucus more abundant in quantity than happens in the natural state; the characters of this secretion vary in different periods of the disease: it is thin and transparent in the first instance, and a somewhat saline taste is felt by the patient. In process of time it thickens and becomes less diaphanous and more viscid; toward the termination of the disease it becomes completely opaque, and assumes a whitish, yellowish, or greyish colour.

We do not by any means consider Consumption, strictly speaking, hereditary—that is to say, however susceptible the system may be to the action of those external agents that eventually give rise to that train of symptoms which ultimately merge in confirmed phthisis; still phthisis is not an integrant part of the native constitution, "to grow with its growth, and strengthen with its strength." This susceptibility may depend on organization, as for instance on a peculiar structure of the skin, the cuticular surface being ill adapted for the functions of perspiration, and delicately sensible to the impressions of cold and damp; also, a mal-conformation of the thorax,

—in fact, what is generally termed a delicate constitution. Hippocrates says that this disease happens principally between the ages of eighteen and thirty-five: that there are instances both before and after those periods of life is notorious, but the system within these limits is most susceptible, and requires a double guard; important changes may be considered as then taking place in the human constitution. As to parentage—the offspring of scrofulous and consumptive, dyspeptic, or gouty parents, will be born into the world with constitutions susceptible of those external agencies which conduct to confirmed Consumption; it is in this way only that Consumption can be said to be hereditary; and thus literally may the "sins of the fathers be visited on the third and fourth generation." Hence natal predisposition or disordered functions, or both conjoined, may give rise to pulmonary Consumption; but accidental and external causes determine the tubercular diathesis.

In hereditary Consumption understood with this limitation,* there is great serenity of mind, buoyant spirits, and flutterings of hope even over the last gleam of the lamp of life. It is a disease so insidious in this instance, that sometimes the patient is conducted to the verge of the grave before the fatality is suspected, and, in fact, there is an extraordinary

* Dr. Johnson does not "attribute *genuine phthisis*, or tubercular Consumption, to the *direct* influence of the climate." "I believe," says he, "the remote predisponent, or, as some term it, the hereditary cause, to be a scrofulous taint in the constitution, or nascent tubercles in the lungs."

self-deception practised by the consumptive patient in always refusing to take the case home to himself. According to Dr. Beddoes, the previous signs of approaching Consumption are unusual lassitude, quickened respiration, depression after dinner, regular evening indisposition, with flying chills and flushes, frequency of pulse increased by the slightest cause, which accelerates both circulation and respiration: cold may give rise to tubercles, or advance their formation when they are already commenced; an incipient cold may be nothing to a healthy individual, but to a consumptive one mortal,—or may induce that which by continued neglect shall hurry to the grave: loss of flesh, colour, strength,—loss of the hair, &c. will alarm the most indifferent relative. To these symptoms may be added a dry cough, unaccompanied by free expectoration. It is stated that if the disease approaches insidiously on young people with "light hair, fair skins, blue eyes, florid complexion, contracted chest, and high shoulders, especially if any of their progenitors have fallen victims to the same malady, a cure will rarely be effected, though the progress of the disease may be protracted if regimen be attended to. "In such cases," continues an eminent medical practitioner, "the slightest determination to the lungs should excite our anxiety and claim our attention; for often when the cough is so trifling as to be only a slight heck, as if occasioned by mucus or phlegm in the throat, we shall find the circulation deranged and considerably accelerated after meals,

especially of animal food. There will not be the same degree of ease in lying on one side as on the other,* and in females about the age of puberty, the catamenia (menses) will not come on. Hæmorrhage from the lungs, under such circumstances, is always suspicious, for, although it often appears to be an effort of nature to relieve the local congestion, yet the ulcer which succeeds does not always heal, and too frequently terminates in confirmed phthisis. The wandering pains and anomalous symptoms which so often accompany the incipient stage of pulmonary Consumption, are embarrassing to the practitioner, nor can any thing decisive be prognosticated from the expectoration, for pus does not appear till the disease is far advanced—too far, alas! for cure." This admission on the part of so able and accurate a writer as Dr. Johnson, shows the difficulty involved in the diagnosis of phthisis. "Pus sequitur sanguinem," though adopted as a maxim, does not always hold good, since both Richter and Bolzano have given examples of the contrary. An abscess in the lungs from pneumonia no doubt has been often mistaken for phthisis, and perhaps vaunted cures may have reference to cases of this kind, or others of a similar complexion.

Dr. Armstrong states that four affections may be mistaken for tubercular Phthisis even when they occur in their least complicated forms; these affections

* Dr. Parr asserts that if the patient can lie on the side where the pain is felt, the disease is *not* phthisis.

are chronic inflammation of the bronchia; ulceration in the trachea; chronic inflammation of the pleura; and lastly, chronic and simple inflammation of some portion of the lungs. "According to my observation," says this eminent physician, "the true tubercular Phthisis only occurs in habits of the strumous temperament; and it yet remains to be proved, whether tubercles be ever formed in the lungs without an hereditary predisposition to them. Generally speaking the strumous temperament appears under two modifications which require to be discriminated. The first of these is found in those who naturally have pale skins, loose flabby fibres, and a sluggish pulse; and the second in those who have ruddy complexions, firmer fibres, and a brisk circulation. Subjects of the first modification have seldom much corporeal vigour or mental vivacity, whereas those of the second often possess both. But there is one thing common to these two modifications—an unusual irritability of the capillary arteries; an irritability which is perhaps one of the most essential peculiarities of the strumous temperament." He proceeds to say, that "the predisposition to genuine Phthisis chiefly consists in an unusual irritability of the capillary arteries in the cellular connecting membrane of the lungs; and where this predisposition exists, any cause agitating or stimulating the lungs may lead to tubercles, and, of consequence, to phthisis."*

Dr. Hastings† has shown that inflammation is accompanied by an enlargement of the capil-

laries. It must be evident that any unnatural or morbid action of this kind will give rise to local inflammation, but it is more difficult to conceive how this long continued should finally merge in tubercles, and the difficulty consists in there being no glands in the cellular substance of the lungs, which are composed of a great number of vesicles, and traversed by a multitude of capillary vessels. Inflammatory symptoms precede their formation, and a subsequent morbid action is their more immediate cause. Dr. Baron, of Gloucester, considers tubercles to have their original sources in *hydatids*, and that these on their ultimate coalescence form them.

The existence of tubercles in the lungs is the cause and constitutes the proper anatomical character, according to Laennec, of pulmonary Phthisis. These are developed under the original forms of minute semi-transparent points of a greyish colour; sometimes, however, they are nearly colourless. Their size varies from a grain of millet to that of hempseed. These particles enlarge their mass, and become yellowish and opaque, commencing at the edge and proceeding to the centre. Those that are in contact, or nearly so, unite and coalesce, and then form masses variable in size, of a full yellow colour, opaque, and having a density somewhat analogous to that of

* Practical Illustrations of the Scarlet Fever, &c. London, 1818. P. 199, 200.

† On the Inflammation of the mucous membrane of the lungs.

compact cheese. About the period of the development of tubercles, the pulmonary tissue, which was previously sound, begins to indurate, becomes greyish and semi-transparent around them by the production of new tuberculous matter, which is semi-transparent in the first instance, and pervades their substance.

Sometimes even tubercular masses of considerable volume are the consequence of a similar impregnation, without the previous characteristics of tubercles in their earliest stage. The pulmonary tissue thus pervaded is dense, humid, and impervious to air, and when cut the section presents a polished and close surface. In proportion as these indurations pass into the state of more mature tubercles, we perceive a number of very minute yellow and opake points developed, which at length increasing and multiplying, terminate by invading the whole of the indurated portion. In whatever way the tubercles are formed, they sooner or later end in becoming soft, and somewhat liquid, and finally suppurate. This softening commences towards the centre of each mass, which becomes more and more soft and humid, until the entire mass is pervaded. In this case, two different forms are presented;—sometimes it resembles thick pus, but without smell, and more yellow than the tubercles—at other times it separates into two parts, one of which is very liquid, and more or less transparent or colourless, at least if unmixed with blood; the other is

opaque, friable, and of a curdy consistency—sometimes it resembles whey with caseous matter floating in it.

Under the section "Productions accidentelles développées dans les poumons," M. Laennec has considered them under six distinct forms: I. Cysts properly so termed. II. Cysts containing vesicular worms. III. Fibrous or cartilaginous substance, or oseous or oseo-cretaceous matter. IV. Tubercles. V. A cancerous substance called *matière cérébriforme*. And VI. A formation which he terms *mélanose*; which last may obtain in four distinct forms—*a*, masses enclosed in cysts; *b*, masses independent of cysts; *c*, under the form of matter infiltered through the organic tissue; and *d*, under that of matter deposited on the organic surface.

Vesicular worms found in the lungs belong to that class to which Laennec gives the name of *acéphalocystes*,—a term which is tolerably expressive. These were called *hydatids* by former observers, and had long been confounded with cysts, being presented under the form of a simple vesicle of variable volume, soft, and having somewhat the appearance of the albumen of an egg, half cooked, or *set*, as it is usually called, and possessed of an ovoid or spheroidal form. These membranes are diaphanous or semi-transparent, colourless or milky, sometimes a little tinged with red, yellowish, greenish, or greyish. The cavity of these vesicles includes a liquid variable in quantity, for the most part serous and limpid, occasionally muddy, and stained yellowish or reddish. Sometimes a large

one includes many smaller ones; while at other times minute ones are found still adhering either to the external or internal surface of the parent, and fall off when they have attained a sufficient size. Besides these phenomena, hydatids possess no distinct organ, and present the type of animal being in its simplest imaginable form—the *termo monas* of animal life. Rudolphi, from a consideration of these circumstances, has altogether denied them a place in the scale of life: though Percy has seen hydatids of this kind *move,* and Laennec also states that he has observed the reproduction of hydatids in every stage, such as is found to be the case with some polypes. These are always enclosed in cysts, which insulate them from the surrounding parts; the cysts are usually fibrous, but often vary. Hydatids float in the liquid contained in the cysts, which is sometimes limpid and at other times opaque or muddy, and when there is only one enclosure, it occasionally fills the entire cyst, and abuts on the membrane. These hydatids may be developed in almost all the organs of the human body, and are often met with in the lungs. They are described with particularity by Johnson, Collet, Mallöet, and others.

From what has been already noticed it is evident that the diagnosis of true tubercular Phthisis is not by any means so clear and palpable as could be wished, and the Stethoscope of Laennec, conjoined with the chemical character of the expectorated matter of the lungs, seems to hold out the only methods of correct

discrimination. The Stethoscope is doubtless one of the most important means of discriminating diseases in the chest, as in inflammatory affections of the lungs and pleura, &c. for it not only indicates the seat of disease, but its amount, and progress, as well as the change effected by the curative means employed. It requires continued practice however to be able to compete in its use with a Laennec, a Forbes, or a Williams. The modifications of sound can thus only be accurately ascertained.

The most common seat of the cavities are the superior lobes of the lungs, and it is here that tubercles usually form in the first instance. On this account the peculiar sound heard by applying the Stethoscope to that part of the breast which immediately covers the spot is called *pectoriloquism*, and is of a double character—either doubtful or evident.

Sir Richard Blackmore divided Pulmonary Consumption into two classes;—that which was intimately connected with the vital stamina, or constitutional organization; and the secondary, as excited by perineumonies, malignant fevers, &c. Dr. Clark gives us the following corollaries as expressive of his opinion:—

I. Tubercles in the lungs are essential to and the immediate cause of Consumption.

II. Tubercles originate in a morbid condition of the general system.

III. The cause of Consumption originates either in a

hereditary predisposition, or in functional disorders, or from these conjoined effects.

It must not, however, be forgotten, that there is another type of Phthisis called *pituitous*, equally fatal, and perhaps more common on the continent than in this country. Camper, the distinguished anatomist, was the first, we believe, to show that there was such a thing as Consumption without ulceration of the lungs. Hence it is found that individuals may die of Phthisis, accompanied with hectic fever, without expectorating throughout the progress of the disease any thing but mucus, while on the other hand, it has been maintained that purulent expectoration is an essential attribute of genuine Phthisis pulmonalis. According to the learned researches of Dr. Bolzano, pituitous Phthisis occurs most frequently in women, and tubercular Phthisis in men. When intermittent fevers terminate in Consumption, it generally assumes the pituitous type, and though hæmoptysis generally ends in tubercular Consumption, it sometimes merges in pituitous Phthisis. Bolzano observes that the cough in the pituitous form of Phthisis is liable to considerable variations, being sometimes extremely troublesome, but afterwards almost entirely subsides; while it is the reverse in other kinds of Consumption. In the former it is less violent, and more frequently deficient than in the latter. In pituitous Consumption the expectoration is more copious than what

takes place in purulent matter expectorated in tubercular Phthisis. One of the best means of diagnosis is the following: when the expectoration seldom undergoes many changes in appearance, it may be inferred that the lungs are ulcerated; when, on the other hand, the expectorated matter sometimes resembles pus, and at other times possesses a peculiar character, it may be generally referred to pituitous Consumption. In tubercular Consumption the lungs are ulcerated, while in pituitous Consumption the lungs may present a healthy appearance. Still, however, pituitous Consumption may terminate in tubercular Phthisis, and in the former death may supervene without the patient having expectorated any thing but mucus from first to last.

The expectorated matter in pulmonary Consumption has long engaged the attention of medical art. Dr. Armstrong has given a sketch of two remarkable fibrous substances expectorated by one of his patients, perhaps belonging to the third division of Laennec's "Productions accidentelles." Hippocrates considered the expectorated matter that of an abscess of the lungs, while modern practitioners have confined it to the purulent matter of the pleura. It would appear also to be different from that of pulmonary Consumption, while an abscess may be formed either in the bronchia or the cavities of the pleura. "Je regarde les vomiques," says M. Laennec,* "telles que les connaissent les praticiens

* De L'auscultation médiate," 2 Tomes, Paris, 1819. Vol. I. p. 116.

et que je viens de les décrire, comme le produit du ramollissement d' une masse tuberculeuse d'un grand volume. L'abondante expectoration qui a lieu ordinairement pendant quelques jours à la suite de leur rupture ne peut pas être regardée comme formée uniquement par la matière tuberculeuse contenue dans l'excavation."

The great object in tubercular Consumption, according to Dr. Clark, should be an endeavour to retard the progress of tubercles towards softening and suppuration, and to prevent any further increase. Tubercles according to him, may exist many years in the lungs without any marked derangement, and if the causes that irritate and inflame be removed, may not materially shorten the life of the individual. Generally, however, they are little influenced by remedies, though medicines may promote the expectoration of softened tuberculous matter.

Remedial measures have been adopted under various forms, in order to resist this dread assailant on the British constitution. Alleviation of symptoms has been produced and the life of the individual been prolonged, or the passage to the grave softened and made more easy; and though cures have been boasted of, it is almost universally admitted, by the most eminent physicians, that those cases are of a very doubtful character, and it is very questionable whether a case of pulmonary Consumption has yet been cured.

Among the means of cure adopted, change of clime has been most relied on, but it is generally that of a forlorn hope; when medicine can do no more, the individual is expatriated, and dies in a foreign land. Dr. Clark says, that a residence in a warm climate may prove beneficial in various forms and stages of tubercular Consumption; but that confirmed Consumption in a far advanced stage, accompanied by hectic fever, &c. can reap no good from change of clime, but contrariwise, the fate of the patient may be accelerated; and climate to be effective must be long continued. This is a tolerably faithful report and summary of what may be expected from change of climate, and it is obvious that this resource can only be had recourse to in very few of the numbers that fall under pulmonary disease.

It has been stated that pure air and an elevated situation are unfavourable, and that those who live in marshy or fenny countries are not so liable to the attacks of pulmonary Consumption, while this exemption has been ascribed to the efficacy of the *hydrogen*, which emanates from stagnant water: it was on this supposition that Dr. Wells recommended the Phthisical invalid to escape to the fenny districts of Essex, Lincoln, &c., as to a city of refuge from the destroyer. It has indeed been asserted that an attack of ague under such circumstances has suspended Phthisis; and that since intermittents have disappeared by the drainage of the fens, pulmonary Consumption has increased. We happen to know, however, per-

sonally an individual of constitutionally predisposed Phthisical habits, the only survivor of a considerable family, victims to Consumption, from the swamps of Lincolnshire. The marshy country is now at length abandoned, and it is suspected that Consumption is even more general there than elsewhere. In a subsequent chapter will be found a case stated to us to have been cured by an atmosphere impregnated with hydrogene. The symptoms detailed, however, did not warrant us to believe that it was a case of genuine Phthisis.

The less frequency of Consumption on the Continent has been attributed to the greater prevalence of hœmorrhoidal discharges, and it is thus inferred that piles, when moderate, are actually salutary and preventive of Phthisis; it has consequently been proposed to determine those artificially by aloetic &c. medicines, or the application of leeches. We suppose also it is tolerably well ascertained that irregularity in the menses, or their suppression, may determine Phthisis, and that on this obstruction being removed the predisposition to Consumption has ceased.

We need scarcely enumerate the multiplicity of remedies and various medicines employed in this complaint, as all have disappeared like "wave succeeding wave." Some of these have been of a very extraordinary kind, such as viper's broth, and snails,—live frogs also have been allowed to hop down the throat. Salvadori's method of cure seems to have attracted greater attention than it deserves. It excited a host

of opponents, who seemed to be of a very pugnacious character: he however directed his patients to climb an eminence quickly till they were out of breath and bathed in sweat, then increase it before a large fire, change their clothes, and live on meat and wine. Gregory prescribed Spanish liquorice in the form of pills. Hoffman wrote a volume on the virtues of asses' milk; even riding on this special animal has been supposed curative. The cow shed has also been recommended as a proper place of repose for the Consumptive. Indeed ingenuity has been severely tasked for remedial means and measures. The vapour of tar and prussic acid have all been tried—in vain. Digitalis or foxglove has been employed by Drs. Ferrier, Drake, Fowler, Kinglake, and others, but with questionable success, for the cases quoted by Dr. Beddoes, &c. do not distinctly appear to be tubercular Consumption, and may have been abscesses in the lungs proceeding from pneumonia. Bleeding and digitalis we believe however are among the more general remedies employed, though altogether of a most questionable character.

Dr. Fothergill's opinion as a forlorn hope was "country air with rest, asses' milk, and riding daily." Preventives are a warm invariable temperature as an atmospheric medium, and proper dress, to keep up a temperate and genial glow of warmth—the feet must be kept warm, but while the dress is of flannel, and a sufficient defence against sudden transitions of temperature, it should not be such as to

enfeeble the patient by too copious perspiration; as this might interfere with the cutaneous discharge.

We may sum up the safeguards of the constitution *versus* pulmonary attacks by a brief summary of the measures of precaution:—these are, early rising, free perspiration, a pure atmosphere, an agreeable temperature, light food and of easy digestion, gentle exercise, warm clothing to prevent the effects of sudden alternations of temperature and condensation of perspiration on the skin,—these will generally prove completely effectual.

We believe Dr. Baron has exhibited with advantage minute doses of Ipecacuanha sufficient to excite nausea, &c. in the early stages of Phthisis; and Dr. Johnson states that, "in the advanced stages, opiates judiciously managed may *soothe* the sufferings of those whom we vainly endeavour to save from the ravages of this insatiable disease. The superacetate of lead also, when joined with an opiate, restrains in a very powerful manner the morning perspiration, which wastes and harasses the patient." "In ulterior stages a more generous diet and even some wine may be allowed. These, instead of increasing the fever and expectoration, will often check both." "Tell us, ye who best can tell," can this be compatible with bleeding, blistering, and setons? The compound powder of Ipecacuanha at night will often restrain, it is added, the morning perspiration, if given in doses of 12 or 15 grains. The sulphuric acid will also do good. It may be remarked that in all probability *nitric acid*

would do as well, and *if pure,* i. e. test nitric acid, the teeth will not be affected, for their enamel will be destroyed by the sulphuric acid generally existing in the nitric acid of commerce, which also contains *lead.*

Among the means of cure warm baths have been resorted to. Patients in the Vallais, according to Dr. Tissot, pass the greater part of their time in the water. At Baden, Dr. Marcard has seen invalids sit four or five hours in the bath—six hours at a time in the warm baths in Silesia are deemed sufficient, and the patients sit up to the chin.

Passing by vegetable diet, milk, discharge by issues, artificial ulcers, *et hoc genus omne,* we may close our remarks on remedies; and as their efficacy may well be questioned, we have been contented with a mere glance at the useless array. The most recent plans and proposals we have heard of are those of Dr. Myddleton, of Exeter, who employs mixed powders in a box, the chief ingredients of which we understood to be *hemlock;*—a circular brush, having a rotatory motion, as in the blooming of cucumbers, &c., by turning a winch, volatilizes, or temporarily suspends these powders in the atmosphere; this is done with a view to *encrust* the lungs. We have heard of no instance of cure; on the contrary, we understood that one of his patients died while we were in that city, and were also told that he had lost his own daughter by pulmonary Consumption. These however might be misrepresentations, and we had no

personal knowledge of the circumstances communicated to us: we know nothing of Mr. John St. John Long's empirical practice, which has been severely criticised and ridiculed. The *lobelia inflata* is however said to be his remedy. This plant is stated in the "Flora Americana," to be common among the woods on the continent of North America. Dr. Cottereau, a French physician, has invented an apparatus for conveying the vapour of chloride of lime into the lungs, acting as a kind of inhaler. The well known effect of chlorides on morbidly affected parts, as had been proved by Delabarraque, and the expectoration of the tubercles detached by its influence in certain recent experiments promise some interesting results in this disease. The committees of the Royal Academies of Sciences and of Medicine have made a favourable report. Sir Charles Scudamore, we perceive, has also announced a work on the efficacy of chlorine, iodine, &c., in Consumption—apparently following in the footsteps of Dr. Cottereau. We first promulgated in our public prelections in the Surry Institution in 1818, the great probability of aerial chlorine proving eventually curative in pulmonary Consumption.

The question of venesection or blood-letting in pulmonary Consumption is a most important one, and it has always appeared to us that copious bleeding here, or even bleeding at all, is an act which would require the justification of a process of reasoning very different to any thing of the kind we have yet met,

with. The system is gradually sinking under the disease, the animal strength is on the decline, and the last prop is taken away, so that by any remedial means employed the chance to rally again is removed; the patient is bled and bled again, and as if this were not enough, digitalis and setons are employed to lay waste the little strength that remains—we dare not venture to give vent to the full expression of our feelings on this subject, and very much question whether this practice alone has not dismissed thousands to their graves, while a temporary relief is surely dearly purchased by the seal of certain death. The loss of power and sensibility is proportional to the loss of blood, and the efficiency of medicines on the system is in that precise ratio diminished, so that we not only deprive the system of the means to rally again, but at the same time take from remedial measures all their efficacy. What is to be expected if we drain the system of its strength, and at the same time render medicines inert and nugatory? It soothes and softens the passage to the grave, as a physician once told us; and is therefore done that the patient "may die easily," for by lowering the strength the last struggle will not be so obstinate! Bleeding has been employed, it may be, to lessen the tendency to inflammation; but it may be reasonably asked, does it do so? and cannot the same end be accomplished by other means? As venesection may be had recourse to to diminish inflammation already determined, we very much doubt whether

copious bleeding would not rather by revulsion increase local inflammatory action. An eminent physician once informed us he had distinctly recognized several cases of apoplexy which followed depletion, and we think that this is not extraordinary. The phenomena of Montgolfier's hydraulic ram, and the principles on which its action is founded, will afford an elucidation of our meaning. Is not an individual who chooses to let blood periodically more subject to plethora than before? or, in other words, is not the tendency to venous congestion increased by the very means which have been adopted to prevent the predisposition or tendency? On this periodic bleeding being neglected apoplexy not unfrequently follows. Those who, instead of reducing a plethoric habit by more rational means, till by excess of indulgence, and a pampered appetite, the veins are gorged, and venous congestion formed, may be assured that though depletion may drain the veins of their vitality the system will soon recruit the waste to overflow; action and reaction are equal in their momenta; and this law in mechanics will be found equally efficient in the physical structure of man. If the tendency to plethora be subdued by early rising, moderate or low diet, and plenty of rural exercise, the system will generally require no lancet for its reduction, while vigorous health may follow: after copious venesection we are afraid the system is never safe for the future, until its stamina are afterwards essentially modified; and how often does hydrothorax, &c. follow frequent and

copious bleedings? We might appeal to facts in order to substantiate our position, that, after copious bleeding, the system has ever afterwards a tendency to plethora and inflammatory action, but we presume that they are sufficiently numerous and notorious.

We are much indebted to Dr. Seed's interesting experiments for some decisive proofs in corroboration of these views. A small dog, which had a wound on the right side penetrating the lungs, was bled by cutting the left crural artery, the consequence of which was that the animal died in about half the time of another similarly treated by dividing the same artery in a dog labouring under no wound, but which was healthy. In the wounded dog, the strength of the heart's motion slowly and gradually diminished; once indeed a sudden and rapid acceleration of the blood took place. We think this experiment conclusive on the question, and cannot refuse assent to Dr. Seed's inference from it, which is as follows: "No one doubts that the integrity of the functions of the lungs is necessary to the health of the body; it appears equally true that the more readily the blood is received into the lungs and returns through them to the heart, the more completely do we enjoy health." "This animal laboured under a wound of the lungs, which impeded their functions and interrupted the ordinary changes of blood; thus, though he lost less blood, he was sooner weakened, and much sooner destroyed than the subject in the preceding experiments." "Does not this experiment

teach us that in some cases of diseases of the lungs an excessive venesection may prove injurious?" We think it does so. A certain quantity of blood is necessary to the complete support of the vital powers, and if it be abstracted and reduced below its healthy medium or standard, the vital powers, roused to a new, extraordinary, and unnatural action, may elaborate a morbid excess, and a serous effusion may follow, if the lungs are not in a state of integrity. It is evident that the usual quantity of blood cannot be aërated, and consequently there will be a tendency to plethora and hæmorrhage, or inflammation may supervene. The causes which predispose to fulness, or which excite, must of necessity be avoided. We quote Dr. Marshall Hall's* accurate, as we think it, caveat against blood-letting as a *preventive* of inflammation: "it has frequently been proposed to repeat the remedy by way of preventive and security against a return of these symptoms. Of all the cases in which blood-letting has been substituted none is so replete with danger." We are not presuming an opinion against venesection in pulmonary Consumption where it is requisite, and some peculiarities of the disease may require it; it is against venesection as a *matter of course,* and undiscriminating and copious blood-letting, or as a preventive; and the cases requiring a very moderate blood-letting will, we believe, be found extremely rare; besides, we much question whether the patho-

* Researches principally relative to the morbid and curative effects of loss of blood. London, 1830.

logy of inflammation is well, if at all, understood. According to the experiments of Dr. Wilson Phillip and Dr. C. Hastings, there is, in this phenomenon, a primary affection of the capillary vessels in an extension or enlargement of their diameters, and a slower movement of more numerous globules of the blood. The capillary circulation is less immediately under the influence of the heart, and since this is the case, it is evident that though the augmented action of the heart may be subdued by bleeding, the local inflammation connected with the capillaries may remain the same. Fatality from venous congestion we consider as by no means incompatible with bleeding to depletion from a sudden reflux of blood to the brain. Dr Hall's Researches are of first-rate importance, and it is hoped will have due weight with those who find a catholicon in their lancet; we doubt not but it would have been well for Pulmonary Consumption if the maxims of Dr. Sangrado had not been so rigidly enforced. Whether the lancet be still employed to the same extent as before, or has given way partially to the topical application of leeches, we cannot tell, but the latter seems on the increase, for in the year 1821 France exported a million and a half leeches, and in 1826 thirty-three millions six hundred and fifty thousand. We might quote numerous excellent authorities to prove that a practice which we have long regarded with special horror, has been opposed by some eminent individuals, while it has staggered others. Dr. Heberden has somewhere

said that in very few diseases does the blood afford the practitioner any useful information. Dr. John Davy observes, that even in violent inflammation the blood is often neither *buffy* nor *cupped*. In ordinary cases of inflammation, as of the pleura and lungs, the blood is at first neither *buffed* nor *cupped*. These therefore, it is evident, are not safe criteria, though they have been received as such without any inquiry into the matter. In pneumonia and pleurisy the blood is examined: if *not* buffed, and other symptoms indicate the necessity of depletion, we continue to bleed—suppose the blood abstracted in pulmonary inflammation supervening on tubercular Phthisis is *strongly buffed*, and the symptoms are little if at all mitigated, shall we, asks the writer, on account of the state of the blood, *bleed on?* or would it not be more rational to subdue by other means? This is a strong question, and it is obvious we might bleed on till the patient dies, and the blood that flows at its ebb appear as cupped and buffed as at first. It is surely time that we pause and inquire what rational good can be expected from or be served by it. In some cases a patient may faint when four ounces of blood are abstracted, and under other diseases not faint when that amount is increased to twenty; thus Dr. Hall informs us that if several patients affected by dissimilar diseases, yet all of the same strength and constitution, be bled *ad deliquium*, they will be found to have lost various quantities of blood.

Dr. Gregory says "blood-letting may perhaps be

occasionally necessary in continued fevers, when the inflammatory symptoms are very high, but I am more and more convinced every day of its general inutility: such symptoms are very soon succeeded by great debility, which this evacuation always renders more dangerous. I have sometimes been led to employ it from the apparent urgency of these symptoms, but had often occasion to regret it afterwards."*

* "Copious losses of blood of all kinds," says Dr. Armstrong, "seem capable of inducing Phthisis in patients in whom a latent predisposition to it had before existed. Copious losses of blood not only exhaust the constitutional powers immediately, but they are invariably followed by an agitated sort of re-action throughout the whole arterial system." And can we doubt if copious venesection disposes the constitution to Pulmonary Disease where no predisposition existed, that it will fail to aggravate the symptoms when incipient Phthisis has already waged war on the system? Blood letting has been, and we believe still is, had recourse to in the primary stages of Pulmonary Consumption. "I have," says the same authority, "in some cases of apparently genuine Phthisis, ordered repeated full bleedings from the beginning until it would have been temerity to proceed farther, yet the disease passed on, and the blood drawn generally exhibited the buffy coat to the final operation." He also contends that, as far as the "buffy coat" was concerned, there still remained symptoms of inflammatory action, and even "the buffy coat may be occasioned and maintained by repeated abstractions of blood."—*Practical Illustrations on the Scarlet Fever*, &c. London, 1818. 8vo. p. 249, 287.

CHAPTER II.

FOOD—IDIOSYNCRASIES—AMUSEMENTS AND CLOTHING—INFLUENCE OF EXOTIC CLIME—CURSORY GLANCE AT SOME OF THE CHIEF PLACES RESORTED TO BY THE INVALID.

Our real wants are few, but luxury has made them innumerable, and almost every thing that moves on earth, in the sea, or air, has been put in requisition, and devoured by that omnivorous animal, Man; and though animal and vegetable life chiefly contributes to his support, we are informed by Humboldt that he discovered a tribe in South America, the Ottomaques, that subsisted partially on a species of magnesian and aluminous earth; and we find also, according to Spix and Martius, that the natives of the river St. Francisco eat earth. This soil contains nitre; and boys and girls may be seen to eat the whitewash of the walls, and sometimes wood, cloth, and charcoal. In South America indeed, according to the same authorities, nothing in the shape of life comes wrong to them, for they eat serpents, lizards, and ounces, and Humboldt has seen children drag enormous centipedes out of their holes, and cranch them up. The Negro children are as fond of a bit of rock salt as those of England are of sugar candy. The mere

catalogue raisonné of substances used as articles of food or luxuries would occupy a volume. Cannibals, or anthropophagi, devour human flesh. At Esmeraldi their delicate morceau is a roasted monkey. Puppies on the Missouri and Mississipi are choice food. Horse flesh in Arabia; elephant's flesh in India; camel's flesh in Egypt. The pariahs of Hindustan, attracted by the smell of putrid carrion, rush in crowds to dispute the mass of corruption with the dogs, vultures, and kites. The wild Bushmen generally devour their food raw. The natives of the Kurulean Islands are very partial to bear's liver. The Chinese are not scrupulous in their choice; cats, dogs, rats, serpents, all are pressed into their *cuisine;* bear's paws, birds' nests, and sea-slug, are dainty bits: raw is esteemed superior to roast mutton by the natives of Thibet. The inhabitants of Cochin-China prefer rotten eggs to fresh, so much so that putrid eggs are rated thirty per cent. higher than fresh ones. Dampier tells us that "the Indians of the Bashee Islands eat the bodies of locusts," and he too relished this species of food. The Tonquineze also feed on locusts, which are either fresh or pickled; sometimes broiled on coals. The inhabitants of Madagascar not only eat them, but prefer them to the finest fish. Rein-deer, and a kind of meal formed of pounded fish, are used in Lapland and Iceland; brind, still quivering with life, in Abysinia; in Australia a good fat grub would be preferred to every

thing else; and in the West Indies a large caterpillar, found on the palm, is esteemed a luxury; while the edible nest of the Java swallow (hirundo edulis) is so rich a dainty, that the auxiliary ingredients of the dish will cost about £15, and after all it is likely to be the indigestible oviduct of some reptile which a sea-bird may have ejected from its stomach. In the Levant the locust (Gryllus cristata) is sold in the market as a chief article of diet. In all these things the continent of Europe is not a whit behind the rest of the world, and Great Britain displays feats which may well excite our "special wonder." Passing over such dainties as *sawer craut, olla podrida, caviar,* &c. France dresses up frogs and snails, con amore. *Frogeries,* and even *Viperiries,* are necessary adjuncts to the mansions of the noblesse. The quantities of frogs we have seen in some of the markets on the Continent have excited in us the utmost surprise; in the market of Auxerre we had the curiosity to inquire the price of snails, (helix pomatia), and found them rated at three francs (2s. 6d.) per 100; not long ago indeed seven snails were charged a franc at an inn in Germany. In Italy we have seen served up the *Pholas, Echinus, Sepia, &c.* while "mine host," at Terracina, asks his guest whether he prefers the eel of the hedge or that of the river. The Astronomer De la Lande was remarkably fond of spiders, and would chuckle them up *sans cérémonie* whenever they came in his way.

We conceive however that Great Britain in these excellencies far transcends her Continental neigh-

bours: not to mention the "braxy" of Scotland, which is putrid mutton, the sheep having died of the rot, it is notorious that game and venison are seldom relished till it is "high," or, in honest and faithful language, till it is a mass of putrefaction, and disengaging in abundance one of the most septic poisons the chemist knows of; in numerous cases it is a mass of life and motion, the offspring of putridity, and though we know not that the monstrous sized liver of the goose, an effect of disease, has yet found way into the English *cuisine;* all the rack and its ingenuity of cruelty and torture have been exhausted to supply the cravings of a depraved and degraded appetite, and one which human nature might well be ashamed of: though the bull may be no longer "baited" for this purpose, pigs are still whipped to death; lobsters are boiled alive; cod are crimped; and eels are skinned, wriggling in agony; not to mention geese, which are duly nailed to the floor by their webbed feet that they may repose and fatten; and then turkies are crammed, and finally bled to death under the tongue; hares are hunted, and die in fevered inflammation, or may be duly inoculated with the poison of hydrophobia, from dogs excited to madness by the chase. Now all these practised cruelties, though they may bleach the cod-fish, or tinge the lobster with ruby, excite inflammatory action, and inflamed surfaces evolve morbid or poisonous matter.

Even honest Evelyn seems to have been somewhat

of an epicure in his way, for he tells us that "the young acorns, found in stockdoves' craws, as well as the incomparable salads taken out of the maws of partridges at a certain season of the year, (which gives them a preparation beyond the art of cookery), are a delicious fare." Well may we say "De gustibus nil disputandum est." Nothing will do now-a-days but French bread, and its whiteness must be produced by *alum;* by and by we presume chlorine will be employed to bleach it! In Paris the sulphates of copper and of zinc are used by the bakers to such an extent as to make the bread noxious. After all this, can we wonder that diseases in direful array should invade our dwellings—and that gout, rheumatism, paralysis, and apoplexy, with Consumption, and the whole host of hepatic derangements, from whence Consumption and kindred pulmonic complaints often spring, with various diseases of the chest, should be our dowery? These are persisted in in utter defiance of the laws of life, and we continue our rebellion at our peril. All this is certainly suicidal, though we may plead lunacy to save us from the sentence of *felo de se.* The only wonder is that pestilence does not ravage our borders and sweep us off wholesale into the grave. As to the *science* of eating, Geta used to eat alphabetically. Petronius describes the zodiac as encircling a dining tray, where an apposite dish was placed on each sign—this last might serve as a hint to the Astronomical Society, and would be quite in character! In these days of

the "march of intellect" we know not what may come to pass; it is not long since it was suggested that our carpet patterns might be made useful in this way, by being formed into *maps*. Should this be carried into effect, it would be at any rate trampling the world beneath our feet! When our pulse beats health, condiments may well be dispensed with—and an artificial excitement will but ill supply the loss or atone for its absence. "No sooner does the appetite fail than the cook, the confectioner, and chemist are up in arms to redress this *grievous calamity*, and caudles, condiments, and tonics pave the way for bleeding, purging, and water gruel." Meals at stated intervals, of five or six hours between;—wholesome food, with a due proportion of animal and vegetable diet,—and this last is essential, because principles are found here which the other cannot supply, but which, if we are not mistaken, are requisite to the support of healthful life—the quantity should always be moderate, and the fare simple and unmixed;—diluents, when nature asks for them, and at no other time;—varied from day to day the board may be, but the appetite should not be tampered with, or despoiled of its simplicity;—these, with early hours and exercise, are conditions necessary to the support of health, and will maintain it.

Generalization in dietetics is all that can be done, for the instinct of our natures will point out the food convenient for us, such as may be safely taken, and will easily digest. It is excess, and the ideal

creation of luxuries, which consume our vitals and destroy us. To particularize in dietetics is a mere useless task and piece of foolery, for there exist not two constitutions or two appetites precisely toned alike; and what is relished by one might pall upon the appetite of another. To construct a metre of regimen, therefore, in the shape of a catholicon, is a useless measure, and would serve very little purpose. Hares are said to eat the seeds of hemlock, and pheasants those of stramonium. Pigs devour the roots of henbane; and, on the authority of Dr. Withering, the ænanthe crocata, though poisonous to man, is eaten by sheep; while the cicuta aquatica, though fatal to cows, is greedily devoured by goats, and even eaten with safety by horses and sheep. Nor is there a greater latitude between the inferior creation and man, than between one constitution and another in the human species. In certain generalizations we may agree, but must allow the instinct of our several natures to be purveyor for us. When our predilections are somewhat out of the ordinary range, or our antipathies wander from the usual beat, then Idiosyncrasy is the appellation by which we designate the eccentricity; and there is scarcely any product, animal or vegetable, that has not revolted some individuals. Thus Henry III. of France, could not endure a cat. We personally know similar antipathies towards poor puss, though the favourite pet of some maiden ladies. Tycho Brache, the astronomer, though accustomed to soar among

the stars, trembled at the sight of a hare or fox. Erasmus could not taste fish without falling into a fever. The Duke of ——— raises his encampment when the hay season sets in, and a worthy M.P. moves off to the sea side when Flora displays her casket, and scatters fragrance on the air. Wadislaus, king of Poland, ran away at the sight of apples, and Johannes de Querceto, secretary to Francis I. of France, would fall a bleeding if an apple were held near him.

Cheese is most frequently the subject of antipathy, but we have also heard of cucumbers, and even sweet almonds and strawberries. Cardan, the philosopher, could not endure eggs. Crassus had an insuperable dislike to bread; and the celebrated Scaliger was thrown into convulsions at the sight of cresses. Mr. Wadd mentions a case in which the odour of ipecacuanha produced the most violent effects; and we know a gentleman who was taken suddenly ill by accidentally smelling at a phial which contained the tincture of digitalis. We were personally acquainted with a case wherein a lady was seized with a cutaneous eruption all over the face, arms, &c. from having accidentally eaten a piece of sponge cake, into which rice flour had entered. The head was swollen to an enormous size, and the symptoms were altogether so frightful and alarming as to threaten immediate danger. Indeed this individual could not even touch rice flour without such contact being followed by symptoms of poisoning. The Honourable Mr. Boyle said he had

a kind of shivering at the repetition of two verses in Lucan. The gums of some individuals have bled at the tearing of brown paper. Pope Pius VII. could not endure musk for a moment, and had to be removed if that perfume were used by any one who entered the papal presence.

The feel of velvet with some persons produces nausea and syncope. A lady informed us that she became exceedingly ill from eating a small portion of a date, and Sir Kenelm Digby says that Lady Heneage had her cheeks blistered by laying a rose upon one of them while asleep. Cardinal Caraffa and a noble Venetian were confined to their rooms for fear of their lives during the rose season. Cardinal Henry de Cardonne swooned at the smell of a rose; and we believe there is a British officer similarly affected from the same cause. So that

"To die of a rose in aromatic pain,"

may be literally true. These are, it is granted, extraordinary and extreme cases, but almost all are tinged with more minute and delicate shades of diversity.

The *chemicals* of the toilet, duly "compounded after the art of the apothecary," very materially assist the messenger of death. There is scarce a cosmetic that is not a deleterious and destructive poison—"Vegetable" and "Grecian" dyes for the hair, eye brows, &c. are solutions of nitrate of silver, a powerful escharotic. Depillatories are compounds of arsenic.

Pearl white, a protonitrate of Bismuth; and lotions for *the skin,* corrosive sublimate! &c.; thus are unsuspecting delicate females lulled into the belief that these are harmless, because they are graced by pretty names,—Oriental, Italian, or French. The incense of burning pastiles is extremely injurious to respiration, and ought to be abandoned by all who value the enjoyment of health. The fooleries and fopperies of fashion; the theatre,* (where lack of morality now seems to be the surest passport to adventurous success,) the ball-room, the rout, and the masquerade swell the train of the hostages of the king of terrors; and the *waltz,* the *gallopade, (à la Giraffe!)* and the *mazourka,* dances that for their *morale,* might well compete with those of Indian tribes, save only that they want some odd adjuncts—these pour forth their multitudes into this Gehinnom, or valley of shrieking. In our earlier years it was usual for gentlemen to ask ladies to dance with them—*nous avons changé tout cela*—for it is said (it may, however, be a mere *on dit)* that in Paris the ladies now ask the gentlemen to dance.

"A few months of dissipation in fashionable society," says Dr. Clark, "turn the scale, and place

* "It has been said, and probably with too much truth, that at least one-third of the frequenters of theatres derive *particular enjoyment* from the performances of persons who have acquired celebrity by their *vices* in private life; and that another third at least consider that the public have really nothing to do with the conduct of actors and actresses off the stage!"——*(London Courier, 22d June.)* So much for the boasted *morality* of the theatre!

beyond the resource of art."—Dr. Beddoes observes, "a faithful delineation of the life led by women in opulent families would appear not less paradoxical than the observances of the most uncultivated tribes appear to us.*"

"Youth has been," says Dr. Johnson, "and ever will be, prodigal of life; and while the sick bed and tomb lie masked under the seductive features of the theatre, the ball-room, and the drawing-room, they will continue to be thickly tenanted by premature decay and self-destroyed beauty."

Unequal clothing, worse than light or flimsy apparel, and a disregard to the changing seasons, which should always be the standard by which to regulate dress, are the great inlets to pulmonary disease. The periods of noon and night require their diverse habits. It has been stated that it were well if silk were now what it once was, worth its weight in gold, as it would check the ravages of Phthisis. Such clothing as in cold weather may insulate the system, and allow in summer a free transpiration from the cuticular surface, should be selected. There are times and seasons when the body must be swathed in flannel. Sudden transitions should be avoided, or due precautions adopted to shield ourselves against their influence; checked perspiration is an evil of first-rate magnitude. Wet clothes are chiefly dangerous when we are stationary in them; when locomotive, their evil influence is

* P. 122.

less. Warm feet are always essential, and when season favours this by exercise, health is its immunity; when sedentary, this pre-requisite to its enjoyment must be secured by other means. We are averse to water-proof dress, for such check and confine the emanations of heat and perspiration, which always operate as long as the lungs play and the nerves exercise their functions, though the latter may be insensible. Wet or damp feet are greatly to be deprecated; and the means adopted to secure this end have often set common sense at defiance;—thus *cork* soles, and other spongy materials, that *absorb* and *retain* the wet contracted by the shoe leather, so that the feet always rest upon a swamp! Thin plates of copper, once used as a substitute, were abandoned in due time, but not until they were found to be poisonous, while the superior conductibility of this metal was overlooked. We more than doubt even the propriety of water-proof shoes, secured by a coat of caouchouc varnish; in snowy or wet weather gollashes will best secure the end proposed, and answer every purpose; damp shoes should be changed as soon as possible; if water-proof, they check the cutaneous functions. We have not considered it right to interfere with female attire; the exercise of good sense and becoming discretion will guide females aright, and direct their choice; and as to those who may consider it unfashionable to reflect or who scorn to think, our remonstrance would be of little avail. We take no note of those nondescripts called dan-

dies—whose movements of course we do not presume to direct.

It is a fact worthy of record, that females of the society of Friends are less frequently, *cæteris paribus*, the victims of pulmonary disease than others, and we have the authority of Dr. Armstrong for this. We would not exactly advocate their monotonous dress, though their attire is often elegant in its simplicity, but we admire the veil of modesty—the loveliest charm of female loveliness—and a profusion of lace and ribands is poor substitution. Gossamer gauze is by no means calculated to protect the system against the chills and damps of a hyperborean region like this of ours.

The importance of climate in relation to the human constitution is one so very manifest as to obtrude itself on the most listless observer. Man, it is true, is a locomotive being, and as such has often tried the influence of exotic clime, and braved the vicissitudes of seasons and alternations of heat and cold. The human system can withstand, to a surprising degree, the shock of extremes, provided they are not too abrupt or long-continued; indeed, every season, as it revolves, presents these vicissitudes and alternations, though less divergent. European constitutions speedily become the victims of tropical clime; or should the storm be weathered, the return to their native country soon numbers them with the dust of their fathers. They return to die and be buried in the graves of their ancestors. The human

constitution cannot long withstand the transportation from Great Britain to an eastern clime, or the shocks by which it is there assailed. It is a fibre in the hurricane—a feather hurried on the surface of the stream to the ocean, where all disappear; and of those who go to Sierra Leone, it may be truly said that they may "eat their bread in haste, ready to depart on the morrow." The Gold Coast is dreadfully insalubrious; out of sixteen hundred, nine hundred persons died there in three years.

To leave the banks of the Ganges, the lofty range of the Himālā mountains, and the plains of Hindustan, with their monstrous imageries and tide of animation, which, like a living thing, invests and heaves its surface,—where, in fact, all is life and motion,—is a tremendous change for mind and matter. To forego the wonders of Elora, or the pomp and pageantry of Hindoo rites and ceremonies, and pagoda worship, and all the gigantic and horrid mythologies of Brahma or Budhu, for the humbler edifices and shrines of Christian lands!—Mandarins, Brahmins, Fakirs, and snake charmers, the Suttee, and the car of Moloch Jaggernaut, to be exchanged for far other scenes and things. The holy streams and holier sources of the Jumna and the Ganges, and palms and banyan trees, are left for the Thames, the Severn, and the shade of the British oak. The transition from such a clime to that of Europe must be terrible;—to forsake the fanning of the talipot—the incence of the hookah —the effeminate ease of the palanquin—the march of

elephants and jungle hunts of tygers—sherbet, pines, and plantains!—but, alas! these exotic luxuries must be purchased at the expense of a shattered constitution, and the sacrifice of half a life rental, while the balance of debility and suffering that remains, subtracts all enjoyment from the futurity of life, for the shattered casement enshrines a feeble, irritable, and discontented mind.

In the pestilence that even walks by noon in the monotonous swamps of Demerara, Europeans find an early grave; few survive the pestiferous atmosphere of that deadly land, or of the Leeward Islands: if they perchance return, they crawl about the wreck of their former selves, and generally after a few short years the vital cord snaps paralytic or in apoplexy.

Mere change of air or of place, irrespective altogether of temperature, has produced the most decided effects in arresting or curing pulmonary disease. The decided advantages that accrue in cases of *hooping cough* are so very palpable that no sophistry can evade the conclusion; and this is powerfully analogous. The *modus operandi* seems yet a mystery, but some localities are more humid or more exposed than others, and these must have their influence. Atmospheric agency on the animal functions will be modified by elevation, temperature, humidity, and the electric condition of the air. In a mild clime it is notorious complaints are mitigated; in the south of Europe, however, the temperature is a variable one, and the prevalent complaints are not subject to regular rules.

The chief countries to which patients migrate in order to escape from this fell destroyer are MALTA, MADEIRA and TENERIFFE, MONTPELLIER, and other parts of the south of France; JERSEY and GUERNSEY, LAUSANNE and the vicinity of GENEVA, NICE, NAPLES, ROME, and PISA, and the south of England. A few remarks on each of these in order may be relevant to the question, and properly precede our observations on what may be rationally expected from change of place, and wherein consists the influence of exotic clime on the human constitution.

The temperature of springs has been supposed a correct medium of ascertaining the mean temperature of any district. This is true of the perennial springs in the vicinity of Edinburgh, as well as of atlantic Europe, and to a considerable extent also of southern Europe. According to Humboldt, however, the temperature of springs in warmer countries is almost always several degrees below that of the incumbent atmosphere. Von Buch found a spring at St. Cesareo, near Palestrina, in the Roman champagna, on the 20th of August, 9° 5 R., the temperature of the atmosphere 22° R., and mean temperature 12° 6 R. Schouw, who has made many interesting barometrical and thermometrical observations, and whose assiduity and accuracy we can, from the pleasure of personal acquaintance, amply attest, has proved—1st. That the mean *daily course* of the temperature of the atmosphere is the same at all hours, a fact which is

proved by comparing the observations made at Leith fort, at Padua, in Apinrade, and Rio Janeiro. 2d. The coldest hour of the day in Europe is five o'clock in the morning, as a yearly mean. 3d. The warmest hour of the day, according to the observations made at Leith, is three o'clock, p.m.; but by those at Padua it is two o'clock p.m. 4th. The progress of the temperature is interrupted near its maximum and minimum grade; the rise is most considerable some hours after the minimum, and the fall of temperature some hours after the maximum. 5th. The heat increases for nine or ten hours, and decreases for fourteen or fifteen hours. 6th. The greatest daily range of temperature in Europe is about 13° F. 7th. At Padua, the daily medium is at 8 hours 41 minutes, a. m., and 7 hours 52 minutes, p. m.; at Leith, at 9 hours 13 minutes, a. m., and 8 hours 27 minutes, p. m. 8th. The greatest daily range of temperature in Europe takes place in July, and the least in December.

Baron Humboldt makes the mean of the coldest month at Edinburgh 38° 3 F., of Paris 35° 1., and Rome 42° 1. Heberden makes the mean temperature of Funchal, in the island of Madeira, as corrected by Dr. Schouw, 67° 3.

According to Humboldt's *Lignes Isothermes*, or lines of equal temperature, Dublin, London, Manheim, and Vienna, possess the same mean temperature, and are as follows:—

	Lat.	*Summer Temp.*	*Winter Temp.*	*Mean.*
Dublin	53° 21′	59° 54′	39° 2′	49° 1′
London	51° 30′	63° 14′	39° 56′	50° 36′
Manheim	49° 29′	67° 1′	33° 8′	50° 18′
Vienna	48° 12′	69° 26′	32° 72′	50° 54′

Dr. Schouw considers that climate has not changed its temperature during the lapse of ages. The date palm he refers to as bearing him out in these conclusions. This species of palm requires a mean temperature of 78°, to mature its fruit, and it is as successfully cultivated now in Palestine as it was in the earliest times of which we have any record. Thus Jericho was called the "city of palms," from the number that grew in its immediate vicinity; and "Deborah's palm tree" is mentioned as situated between Rama and Bethel. We have the authority of Pliny that the palm tree was frequent in Judæa, and chiefly about Jericho. Tacitus, Josephus, Strabo, Diodorus Siculus, and Theophrastus, all mention groves or woods of palm trees there; date trees are often seen on Hebrew coins: the date palm, it will be remembered, has been adopted as a type and emblem of Judæa, in the coin of Vespasian, termed "Judæa capta" from its inscription, and which bears on the reverse the captive daughter of Zion, weeping under the palm tree. We have a cast of one found a short time ago at Gloucester: the date palm is in fruit, and so well represented, that it cannot be mistaken.

Malta.—This island certainly possesses several

advantages over many other places for the invalid. Valetta, its capital, is on the north side of the island, and the Scirocco winds would in some measure be modified by their transit over the island, but we should still think a modified Scirocco (or S.E. wind) breeze most unfavourable to the pulmonary invalid. We have been smitten by its influence on the shores of the Mediterranean, and can readily conceive how balefully it might act where the lungs are morbidly affected. In winter, however, at Malta, the northerly winds are always tempered by crossing the Mediterranean, after they leave the chilled surface of Europe; while along the southern parts of Greece these winds still maintain their original coldness: the reverse of all this obtains towards the close of summer—these winds being cool at Malta, and dry and hot on the southern shores of Greece. A violent Scirocco wind was experienced at Malta on the 16th of May last. The atmosphere was thick and cloudy, accompanied by a dense haze, which appeared as if it were only a covering to an immense fire; it was extremely dark, and a considerable quantity of red sand fell, the grains of which were so minute as to be almost impalpable: the rigging of the ship appeared as if powdered with brick dust, and it seems to have been wafted from Etna.* We observe by letters from Naples, that a similar phenomenon was observed there, and we believe it extended even to Rome.

* This eruption has opened six new craters, and overwhelmed eight villages.

Madeira.—Dr. Clark says, "the climate which of all others I consider the best suited to Consumptive patients generally, is that of Madeira." And again, "To such Consumptive patients, therefore, as are likely to derive benefit from climate, I consider Madeira as affording altogether the best residence."* It certainly appears that the temperature of the winter there is higher and more equable,—circumstances that must plead very much in its favour; on the other hand, the rise of temperature in summer is sometimes so considerable as to operate injuriously, and even render removal at a specific period of the year expedient. Dr. Heneiken says, "since the summer of 1821, about thirty-five invalids have either reached or sailed for Madeira; of this number two or three died on shipboard, and three within a month of their landing. Five or six just survived the winter; about an equal number lingered through the spring, and three or four entered upon and passed through a second winter. Of the whole number, thirteen only, including myself, are now in existence, (1824.) Two of these were cases of asthma, and two of chronic disease of the trachea and larynx; if these be excepted, and those be considered as dead who cannot be alive three months hence, the survivors of the original number of about thirty-five persons in the short space of two years and a half, and who, so far

* "The Influence of Climate, &c." London, 1830. 8vo. 2d Edition page 345.

from being cured, can only make the best of a precarious existence, in a low latitude, will be reduced to six." This is a very discouraging account of the curative effects of the climate of Madeira, and even the natives seem to have little faith in it; for no sooner does an invalid land on the shores of the island than the remark is made—"there goes another to the Orange tree"—the English burial ground. Still its insular character, conjoined with its tropical temperature, will mainly aid the curative measures adopted, and check the progress of the disease, by imparting to medicine the balance of chances; because whatever "head-way" (to use a nautical phrase) we may make on the disease in this country, it is neutralized by the coming winter, and, like the stone of Sysiphus, recoils to the point it originally possessed. Besides, it cannot be denied that in almost every case this is adopted as a forlorn hope or *dernière ressource*,—when the disease is verging on its climax: the individual lingers to the last, and hope still "tells a flattering tale," while expatriation is a painful thought to all the individual's relatives and friends; and when it is considered too that the probabilities are, the exile of England may never return. Teneriffe we consider as possessed of the tropical and insular influence possessed by Madeira, and that the difference, if indeed there be any, is altogether trifling.

In Portugal Consumption is frequent. At Lisbon patients are sent to the other side of the Tagus.

This disease, it has been asserted, is contagious,—a question which has been stoutly contested, and with reason. In Portugal it is certainly regarded as such, and so much so indeed, that a rigid quarantine is established: the poor invalid is completely insulated, and occupies a distinct compartment of the house, cut off from all intercourse with the family, with separate bed and table linen, knives, forks, dishes, &c., as if it were a lazaretto infested with the plague. There seems no tangible evidence that Consumption is contagious.

Montpellier.—Mr. Matthews observes that "it is difficult to conceive how Montpellier obtained a name for the salubrity of its climate. For pectoral complaints it is probably the worst in the world. It is true there is almost always a clear blue sky, but the air is damp and biting. You are constantly assailed by one of two winds, which are always blowing, bringing cold or damp." It is an unequal and a humid atmosphere that does the mischief. We have been taught to put this name as a pass-word for all that is salubrious and delightful in clime, while in truth it seems altogether undeserving of such an epithet: however, the word has become current, though it appears on insufficient grounds.

Nice seems to be also lauded, but Dr. Clark observes its remedial influence will be chiefly beneficial in cases where there is a tendency to hæmorrhage, or congestion. Dr. Carter, as well as Dr. Clark, unites his testimony with Mr. Matthews, in considering

Nice as unfavourable to pulmonary diseases. The air here, says Mr. Matthews, is pure, keen, and piercing, though "a soft and balmy air, oranges growing in every garden, lodgings without a chimney, and beds with musquito curtains, present the first signs of Italy." Villa Franca, near Nice, has been regarded as a favourable retreat for the invalid, and combining many advantages; during winter it averaged six degrees of temperature above that of Nice. The hills which closely environ the houses on the N.W. and N.E. attain an elevation of from four to six hundred feet: the bay lies N. and S., and the country is exposed to the full influence of the sun. The wind does not affect it, except when it blows from the S. and S.E. The ascent of the amphitheatre is precipitous, but mule paths are cut in every direction round the acclivity; the soil is extremely luxuriant. "Hanging gardens adorn the barren ranges of hills with a rich clothing, being covered with the olive and carrubea, the fig, the almond, and the orange tree." Altogether it appears to be a remarkable and beautiful spot, and continental opinion seems to invest it with the grade of superiority, suitable as a residence for the pulmonic invalid.

From what we know personally of Genoa and its vicinity, and comparing it with the climate of Nice, as described by those who have visited that part of the continent, we should consider that Genoa possesses the same advantage of climate as Nice, with the superadded advantages of a fine city. In winter we

have felt the weather sometimes rough enough, but the orange, and other traits of vegetation, concur to prove the climate similar; and we have seen several great American aloes in flower on the walls of that city.

> " Ecco! Vediam la maestosa immensa
> " Cittá, che al mar le sponde, il dorso ai monti
> " Occupa tutta, e tutta a cerchio adorna."

This description of Genoa by Bettinelli is not overcharged, and in truth we know not a more splendid spectacle than the city seen from the sea. While the orange and pomegranate flourish at Nice and Genoa, they do not succeed in Tuscany: at Fondi we found a few orange trees in the open fields, and passed through a considerable plantation of them at Mola di Gaeta, between that town and the shore. The dwarf palm, which grows in the southern provinces of Spain, we remember to have seen in the open garden at Orbitello, on the coast of the Mediterranean, and there the great American aloe (Agave Americana) is used as a field fence. Even at Nice the dwarf palm succeeds tolerably well, though at Rome it scarcely weathers the clime; there is, however, one on the Aventine Hill, amid the ruins of the palaces of the Cæsars, and Nero's golden house: it seems to wave mournfully in the breeze, being alone. Physicians of course are inclined to laud the particular district where they reside, and M. Richelmi, of that town, exalts Nice as every thing that can be wished

for,—the very *el dorado* for the invalid in the pursuit of health. Though rains are generally rare—towards the end of September it usually rains, almost without intermission, for one or two weeks together, and this is repeated about the beginning of November. When the thermometer at Turin or Paris indicates a temperature of 98 F. that of Nice may be 86°. The country is compared by Richelmi to a "vast garden of orange, lemon, citron, Siam orange (pampelmouse) olive, &c. trees." "The family of orange trees is there very luxuriant, very common, and cultivated to the height of forty metres above the level of the sea. The olive trees attain great perfection, and grow to a considerable size." "Vineyards are found every where, but more particularly on the hills." "Cheerful meadows separate the forests of orange from those of olive trees." We there admire some beautiful palms to which even Rome, though situated more to the south, is obliged to pay a tribute, for the use of their branches. The sugar cane, the pepper tree, and the cotton shrub are cultivated in some gardens, and, according to the opinion of good authorities, the pine-apple would grow in the open country.

Italy.—The climate of Italy seems altogether unfavourable to the invalid. This land of the Latins and of the myrtle is, however, exceedingly diversified. At Naples it is too hot and relaxing in summer, and Rome and Pisa seem altogether more favourable residences. Of Naples, Mr. Matthews

says, "Oh! this land of zephyrs; yesterday, (Feb.) was as warm as July; to-day we are shivering with a bleak easterly wind, and an English bleak frost. Naples is one of the worst climates in Europe for complaints of the chest, and the winter is much colder here than at Rome." Even the bay of Bäiæ, whither the luxurious and effeminate Romans resorted, though the bay itself be delightful and the tidal breeze fans its shore, is far too relaxing and unequal. The volcanic agency which is every where incessantly at work with its electricity, and temperature, and vapours of various kinds and hues, must combine to render that part of southern Italy insalubrious. The island of Ischia, in the gulf of Naples, has been pointed out as much preferable to Naples, or its immediate environs, and there are solid grounds for the election. Rome and Pisa seem to be much extolled by Mr. Matthews, and as he was an invalid he spoke feelingly, and on that very account his evidence is valuable. "I believe," says Mr. Matthews, "that Pisa is the very best place on the Continent during winter for complaints of the chest, and Nice perhaps the very worst. Pisa is situated in a low plain, its air is warm, mild, and muggy." "If there be any climate preferable to Pisa it may perhaps be Rome, where the air is pure without being piercing." The annual fall of rain at Pisa has been estimated at a depth of 47 inches, nearly double that of our own climate, while its duration is not one-half. "The spring," says Mr.

Forsyth, "is short, for violent heat generally returns with the leaf. In summer the mornings are intensely hot, and at noon the sea breeze springs up. The nights are damp, close, and suffocating when not ventilated by the *maëstrale.*"*

If the sea air disagrees with the patient, Rome and Pisa are recommended by Dr. Clark. At Pisa too the rocks are calcareous, and this may concur to render it less humid. The baths are truly delightful, and the warm bath has been recommended in Pulmonary Consumption. We remember to have visited a fine sulphuretted spring at a short distance, so that the patient has this additional resource. The Arno sweeps through the city and contributes to its salubrity; and yet Pisa, notwithstanding all these, is desolate and forsaken. Our residence at Pisa, however, was limited. Annoyance from musquitoes will be felt at Pisa, though not at all comparable with that at Venice, which we found so great as to abridge our sojourn.

During a four months residence in Rome, we can attest the full enjoyment of health, though we cannot vouch so much for other parts of Italy; and though the climate is not what it was in the time of Julius Cæsar, when the Tiber was frozen, we have felt a keen frost, and even witnessed the "nivea Soracte" entitled by its mantle of snow to the adjunct applied in the olden time, when the phenomenon

* Remarks on Antiquities, &c. 8vo. London, 1813, p. 29.

was less rare than now. The winter in the north of Italy, though not prolonged, is often very severe, while it lasts; in Piedmont for instance, the vines have to be removed from the poles which support them, to be prostrated in the dust, and at Turin the water in our room has been congealed in a single night to a solid mass of ice, and even the bottle broken by the expansion.

Switzerland seems but ill adapted to diseases of the lungs; the climate is exceedingly varied, and almost every modification may be obtained. The equality of temperature is liable to be disturbed or broken by gales from the Alpine regions, chilled by the glacier or the snow plane, and rushing toward the spot heated by the sun beams. Thus the hills around Lucerne are seldom free from a sprinkling of snow during the entire year. Berne is perhaps too exposed, and Lucerne and Zurich too low and humid. Dr. Clark thinks the neighbourhood of Geneva the least exceptionable. Geneva, however, we humbly conceive to be far too low and humid for pulmonary diseases, and a physician of that city advised an individual, whom we knew personally, to move to Lausanne. Vevey is too hot during July and August, and Lausanne is much exposed to the north winds, and of necessity to sudden changes of temperature, though, as a whole, we should certainly much prefer Lausanne to any place we are acquainted with round the Lake of Geneva. The following is the

register of temperature which we observed during our residence at Lausanne:—

THERMOMETER.

Lausanne, 1570 feet above the level of the sea, and 450 feet above that of the Lake of Geneva.

1825.			Fahr.
June 27	On the Lake of Geneva,	at 10 and 20′, a. m.	69°.5
—	Lausanne,	at 9 and 30′, p. m.	68
28	—	at 10, a. m.	67
—	—	at 10 and 20′, p. m.	70
29	—	at 9 and 10′, a. m.	65
—	—	at 9 and 25′, p. m.	63
30	—	at 10 and 15′, a. m.	63
—	—	at 10 and 25, p. m.	64
July 1	—	at 9 and 30′, a. m.	65
—	—	at 9 and 45′, p. m.	63.5
2	—	at 10, a. m.	63
—	—	at 8 and 15′, p. m.	66
3	—	at 10, a. m.	63
—	—	at 8 and 30′, p. m.	66.5
4	—	at 10 and 30′, a. m.	65
—	—	at 10 and 10′, p. m.	62
5	—	at 7, a. m.	61
—	—	at 8 and 30', p. m.	65
6	—	at 8 and 30', a. m.	63
—	—	at 10 and 20', p. m.	66
7	—	at 10 and 20', p. m.	63
—	—	at 11 and 35', p. m.	62
8	—	at 9 and 15', a. m.	66
—	—	at 10, p. m.	68.5 wet.
9	—	at 9, a. m.	59 wet.
—	—	at 9 and 30', p. m.	63
10	—	at 9, a. m.	62

1825.			Fahr.
July 10	Lausanne,	..... at 8 and 30', p. m.	...67
11	—	..... at 9, a. m.	68
—	—	..... at 9 and 15', p. m.	67
12	—	..... at 8 and 30', a. m.	...64
—	—	.... at 10 and 10, p. m.	...66
13	—	..... at 9 and 30', a. m.	...64
—	—	..... at 8 and 10', p. m.	...69
14	—	..... at 9 and 30', a. m.	...67
—	—	.... at 10 and 15', p. m.	...71
15	—	..... at 9, a. m.	68
—	—	..... at 9 and 45', p. m.	...73
16	—	..... at 8 and 15', a, m.	...69.5
—	—	..... at 9 and 15', p. m.	...74
	(In shade, 12 to 2, p. m. 86°)		
17	—	..... at 10, a. m.	73
—	—	.... at 7 and 45', a. m.	...75
	(In shade, about 2, p. m. 86°)		
18	—	..... at 9 and 25', a. m.	77
	(In shade, about 2, p. m. 83°.5)		
—	—	..... at 9 and 40', p. m.	...72.5
19	—	..... at 9 and 30', a. m.	..74
	(In shade, at 3 and 30', p. m. 84°)		
—	—	..... at 8 and 30', p. m.	...79
20	—	..... at 8, a. m.	74
	(At 3 to 4, p. m. 85°—at ½ past 6, p. m. 84°)		
—	—	..... at 10, p. m.	79
21	—	..... at 8 and 45', a. m.	...74
—	—	..... at 10, p. m.	75
22	—	..... at 8 and 45', a. m.	...71
—	—	..... at 11, p. m.	71

At Paris, on the 15th, at midnight, the temp. was 18° R. (72° F.) On 16th, at noon, 24.2 R. (86 F.)—at 1, p. m. 24.2 R. (86 F.—at 2, p. m. 24.5 R. (87 F.)

Paris, 15th July, at 2, p. m. 23.3 R.—at 3, p. m. 23,4 R.

Guernsey and Jersey have been sometimes resorted to by invalids, and we believe with as much success as could reasonably be entertained, for the truth is that the specific climate which may suit one individual, may not prove sanative to another. Altogether independent of idiosyncrasies, or constitutional differences, the disease may have assumed diversified stages, or be modified by circumstances, and the type may be altogether different; for it must be acknowledged that the pathology of Consumption has not been so clearly defined or so much attended to as might have been wished: thus Tubercular Consumption has doubtless been often confounded with Phthisis pituitosa. Insular clime is often very much softened, and sudden transitions of temperature checked under a latitude which would otherwise prove injurious by its severity. The Isle of Man, we believe, is considered a healthy climate, and we have seen the broad-leafed myrtle luxuriate in an exposed situation, to the height of twelve feet, nor do we remember to have been told that it required any shelter whatever in winter. The Borromean Islands in the north of Italy afford similar illustrations, though on a small scale.

We should be afraid, if a residence in the south of England did not effect a recovery when had recourse to in proper time, that a residence in the south of France or Italy would prove of little avail. Dr. Clark seems to point out the Isle of Wight as a desirable residence for invalids, while Dr. Harwood recommends Hastings. The coldest month in 1828,

at Hastings, was February, with a mean temperature of 44°. The mean of the same month in 1826, was 43° 5. This is much in favour of the mildness of its winter. It appears to be tolerably sheltered from the N. and N.E. winds by the surrounding hills, though its extent is limited to a small local district. In January, February, and the Spring months, Hastings seems to possess an advantage over the other places on the S. coast, in warmth and shelter from cold winds, with the exception, perhaps, of Undercliff, in the Isle of Wight. During the autumn months, and even December, the climate of Brighton appears to be somewhat more warm and steady than Hastings, It appears, however, by Dr. Clark, that agues are not unfrequent about Hastings: he considers the climate of this part of the coast unfavourable to nervous complaints, and to those who are subject to head-ache and to languid and relaxed habits. Dr. Johnson observes, that the shores of Hants and Dorset are the most favourable retreats in Britain, " as being equally removed from the piercing easterly winds and rain-fraught gales from the western ocean, while a broad expanse of ocean lies in front. Penzance, however, appears to combine the greatest advantages which England can afford for the phthisical invalid." While neither the apricot, vine, nor green gage plum ripen their fruit at Penzance, the myrtle, and the camellia luxuriate in the open air,—facts which prove at once a diminished solar temperature in summer and the mildness of its

winter. The temperature at Rome, at 2 o'clock p. m. is 7° warmer than Penzance, but at 7 a. m. the latter is precisely of the same temperature as that of Rome.

From west to east we have Salcombe on the south-west coast, the "Montpellier" of Huxham, remarkable for the mildness of its climate, but too limited in extent. Torquay, Dawlish, Exmouth, Salterton, and Sidmouth are all in the same chain and line of coast, and resorted to, we presume, *cæteris paribus*, with equal advantage. The village of Heavitree, close to Exeter, has received the credit of possessing a mild winter atmosphere. As far, however, as our personal knowledge of Devonshire extends, we know no locality to which we should give the preference in pulmonary diseases to Moreton, a village about 12 miles from Exeter, on the borders of Dartmoor Forest. The ground in the vicinity is high and rocky; it is dry and well sheltered by surrounding hills, while it is freely ventilated by winds. There are few trees or brushwood. The rocks are granitic, and the Haytor granite comes from quarries in its vicinity.

To enter on the consideration of the various ingredients which constitute a good climate, would involve so many circumstances, and so broad a field of discussion, that a volume would be required for the exclusive theme, and after all, would be a mere "utopia," or the beau ideal of meteorology. Nor is it likely that such a clime as might be *constructed*, from elements scattered here and there on the surface of the earth, to be any where found. Besides, after

the *val paraiso* had been prepared, it would require homogeneity, and this too general, in the materialism of the constitution, to fit it for universal adaptation. The cloudberry, that luxuriates so well on the Alpine range, would perish in the valley; and the native of the plain would wither on the mountain top.

CHAPTER III.

TROPICAL, INSULAR, AND ALPINE CLIMATE——A MARINE ATMOSPHERE—THE SEA COAST—TOWN AND COUNTRY.

Success of exotic clime in Pulmonary Consumption will depend on a variety of circumstances, such as the constitution of the invalid and stage of the disease, with the specific kind of Pulmonary affection, as whether it belong to that called pituitous or tubercular Consumption. On this question it must be acknowledged there has been much diversity and contrariety of sentiment and opinion. A change of climate will act in some measure, no doubt, as diversity in diet does on the system; by change of place there may be a change of density and of elasticity in the air. Its relation to moisture may be very different, and its electric character and condition perfectly novel compared with that to which it may have been accustomed—the very pathway, as to its absorbent or retentive character, may be possessed of meteorological relations of a different stamp, and the breeze which fans the spot one more favourable than that pneumatic atmosphere from which the constitution has escaped, since a natural circumvallation may exclude such winds as might prove injurious, and

yet leave it to be freely ventilated by the current which contributes to salubrity—there may in fact be

"Health in the breeze and shelter in the storm."

There can be no doubt that absence from scenes that fret, irritate, and tire, and an introduction to or acquaintanceship with scenes and subjects of a different complexion, must contribute by their novelty and excitement to allay the fever of the mind, and remove one great obstacle to the remedial measures resorted to: and it cannot be denied that mental care and inquietude are not only great drawbacks to the full operation of medicines, but in many instances, altogether counteract and defeat their efficacy. Still these are transient and subordinate. A mild and equable temperature, not liable to be ruffled by sudden incursions of change, and an atmosphere insusceptible of humidity, are conditions for which we should stipulate—neither a confined and stagnant atmosphere, nor one ruffled by the storm: the balmy breeze may still play freely, and yet not visit us too roughly. Where a mild winter reigns the curative system can be pursued without limitation or interruption, and remedial measures thus prolonged may ultimately triumph, that might be altogether defeated by a brumal relapse. The transition from one sudden extreme to another, as from heat to cold, must predispose the system to pulmonary complaints. Mr. Edwards, in his reply to Dr. Beddoes, states that Consumption is rare in the West Indies,

but that the natives are very liable to attacks of Consumption on coming to Great Britain. Considered analogically, we may suppose the converse of the position favourable to the check of pulmonic disease, and accordingly find that it is so. Since trees attract moisture, and some trees do this more than others, we had better not rear our residence under their shade, while a carpet of vegetation may at once cheer and enliven, and be the great means of sustaining a chemical as well as an electrical equilibrium. Our climate is one incessant circle of change, characterised by vicissitudes of moisture and dryness, and rapid alternations of heat and cold. "Placed nearly," says Mr. Daniel, "in the centre of the temperate zone, where the range of temperature is very great, the atmosphere is subject on the one side to the impressions of the largest continent of the world; and on the other to those of the vast Atlantic Ocean. Upon their coasts the great streams of aqueous vapour, perpetually arising from the western waters, first receive the influence of the land, whence emanate those condensations and expansions which deflect and reverse the grand system of equipoised currents. They are also within the frigorific effects of the immense barriers and fields of ice, which, when the shifting position of the sun advances the tropical climate towards the northern pole, counteract its energy, and present a condensing surface of enormous extent to the increasing elasticity of the aqueous atmosphere." An escape from these contingencies is

very desirable where the question so intimately depends on the relations of the atmosphere to the organs of respiration.

The thunder storm restores the disturbed equilibrium of the atmosphere: intense and humid temperatures are extremely oppressive: the lungs do not play freely, and the system is overpowered by langour and lassitude; the thunders utter their voices, the lightnings play, and nature at length recovers from her swoon, and looks gay and cheerful again. A proper play of electric affinities will therefore be found intimately connected with a salubrious atmosphere—and in truth, when it glides freely along the nervous chord, its "discourse" is health. A gellid atmosphere, when charged with moisture, affects us deeply. 'Gloomy November' invades the very vitals of health—It is *moisture* which untwines the animal fibre, and disintegrates its cohesion. When similar diseases prevail over a vast tract of country, and occur simultaneously, it seems reasonable to attribute them to a common cause, and, with endemic and epidemic diseases, they may very naturally be conceived to have their source in atmospheric influence. Local causes, no doubt, will give rise to specific effects, that may differ very essentially from those that are generally prevalent.

That the thunder storm must necessarily exercise a considerable influence on climate may be readily imagined when it is remembered that not only does it tend to promote a more equable diffusion of heat and moisture, and introduce nitrous acid gas to check the

evolution of noxious miasmata by effecting their decomposition; but from some experiments made by Signor Libri, of Florence, on odoriferous bodies by currents of electricity, it may be inferred that the direct and immediate agency of the storm may be the destruction of subtile emanations. The elasticity of the atmosphere may be also materially affected, since ammoniacal gas may be expanded into double its former volume by a current of electric sparks passed through it.

The atmosphere consists of twenty-one per cent. of oxygene, and seventy-nine of nitrogene; and if the proportionals of oxygene and nitrogene be reversed, and the new measures be made to combine, *nitrous acid gas* will be formed. The Honourable Henry Cavendish, by passing a current of electric sparks through a quantity of atmospheric air imprisoned in a glass globe, soon obtained evidence of the production of nitrous acid, in the red fumes which made their appearance. It is evident that during every thunder storm, a portion of our atmosphere will discover a similar change; the same agent, only on a more magnificent scale, is at work; the medium operated upon is identical, and the result must be similar. During the rain which falls in a thunder storm, we have repeatedly had unequivocal evidence of an uncombined acid—we think the *nitrous* acid—at least we cannot reasonably refer the phenomenon to any other. It is in this relation that we chiefly regard a tropical clime as successful in Pulmonic disease, whether

there be an ulcerated tissue or an inflamed surface; for, in countries situated within the tropics, or verging on their confines, the atmospherical electricity is of a more intense kind and a higher character; and thus it is too in our own country, Pulmonary Consumption is not so rife when the electric character of the atmosphere is employed in distributing the elements of health, and preserving the equipoise of humidity.

It cannot, therefore, be a matter of any difficulty to account for the formation of *nitrites of lime*, &c. on damp walls, for this merely supposes the condensation by moisture of the nitrous acid, which in greater or less quantity is the offspring of every thunder storm, or the immediate effect of atmospheric electricity: the subsequent decomposition of the muriate of soda, which acts hygrometrically and becomes deliquescent, and combination also with the lime, would form nitrites of soda and of lime; the muriate of soda is generally introduced by means of the sand employed in the plaster or mortar. Now, the direct tendency of nitrous acid is *antiseptic*,—it will, therefore, destroy those various germs in the air which might irritate or inflame; hence such an atmosphere will be purer and better adapted to the requirements of healthy respiration: it also checks inflammatory action, and heals an ulcerated surface, and if brought in contact with diseased lungs, through the medium of respiration, its office is obvious enough. It will be remembered that Dr. Carmichael Smyth received a remu-

neration from Parliament, for the employment of nitrous acid gas in the arrest of contagion. The phenomena of the thunder storm is of a piece with this, and reflects a light upon the measure adopted by him.

Insular clime will be effective in the ratio of the extent or surface circumfused by the ocean, and its flatness or bold and rugged features. If studded with extensive woods, the climate may be a very humid one, for trees attract, retain, and condense moisture; and the proximity of that vast reservoir of waters which surrounds it, affords by evaporation—a process incessant in its operation—a continuous supply. This contributes to the humid atmosphere, which reigns constantly "lord of the ascendant:" the sea and land breezes will of necessity be more constant and equable, and the extremes of temperature will not be seen in such sudden starts as elsewhere. The sea preserves a remarkable uniformity of temperature, and that of winter, compared with that of summer, is not separated by such extremes as the air incumbent over an inland surface. Seeing, therefore, that the air incumbent over the ocean will necessarily participate in its uniformity, that floating over a small island will feel its influence, and, except when the atmospheric wave from a distant source visits its shore, its climate will present a tolerably uniform temperature; because when the air incumbent over the land is overheated, the marine atmosphere will rush in to restore the balance, and support the equi-

librium. In the vicinity of Marseilles, Dr. Raymond found the land often heated to 160° F., but the temperature of the sea never rose above 77°. In winter he found the earth lowered down to 14°, but the sea never under 44°. Ranges of hills will tend very much to disturb this equipoise; and rivers will also concur to form a channel for the breeze; the absorbent capacity of the rocks and soil will also materially influence the question, and the degree of opacity which their surfaces present, will, in like manner, affect the insular temperature. It is obvious that, if we except these accidental circumstances, an insular clime, as far as temperature goes, should be tolerably uniform, and present a desirable locality for pulmonic disease. But we conceive that Pulmonary Consumption has much to struggle with in reference to humidity; and from preceding observations, woods and rocks condense atmospheric moisture. In proof of these remarks we have only to look at the cloud-capt rock, to be convinced that such elevations exercise a mighty agency in attracting and discharging clouds, the great reservoirs of moisture. In our Treatise on Atmospherical Electricity, we have mentioned some remarkable facts connected with the relation of trees to moisture, and of considerable importance in the natural history of climate.

The influence of trees on climate is indeed great: they attract and condense vapour, and even in regions doomed to arid sterility, a perennial verdure may be found in their vicinity. From cutting

down the woods many brooks in Kentucky fail in summer, and in New Jersey streams have been entirely dried up. Extensive woods may render a climate very humid that might otherwise be parched with drought. All trees, however, do not act alike in this respect.

Alpine climates are very variable, and at every advanced plane of elevation there is a different density and range of temperature and humidity, while the atmospherical electricity varies in degree, and is changed in kind. In the plain we may gather the "clusters of Eshcol,"—there too the pomegranate matures its fruit, and the almond tree flourishes, while a few short hours' walk introduces us to regions of eternal snow and thick-ribbed ice; and should we desire to nestle in some dell or defile among the mountains, our genial atmosphere might be chilled by the cold blast, wafted from mountains of snow, or glaciers "pinnacled in cold sublimity:" perhaps, too, we and our reveries may be buried together by an avalanche hurled headlong from the Alps, or some mountain-slip, that might bear us away and overwhelm us with its ruins. As to the vallies in such countries as Switzerland or Savoy, it is not conceivable that where Bronchocele is endemic, it can be considered eligible for Pulmonary Consumption. On the other hand, though we cannot see how Alpine regions could thus benefit the invalid, in reference to a permanent abode there, we are strongly of opinion, from our own personal observations, that

to rusticate in some hollow, in a sheltered ridge on the mountain acclivity, for a short period in summer, might be attended with good effects; but locomotion will be found most beneficial, and to undulate from the mountain to the valley may impart fresh vigour and brace the frame anew. When we compare the hardy features and brawny muscles of the Alpen Jäger with the sallow, haggard countenance of the inmate of the Pontine Marshes, on the plains of Italy, we soon become sensible of the difference between a stagnant dense atmosphere, loaded with vapour, and a bracing, elastic, and dry medium, diminished too in density, and necessarily also in pressure. It has been said that the mountain tenantry are not free from Pulmonary attacks, and hence it is inferred that a residence among the mountains is not desirable. The same objections may be urged against Penzance, for Consumption is to be found located there. Besides, all this will entirely depend on the altitude of these ranges; for though in the mountains in this country, which rise to no great elevation, the surrounding atmosphere may be saturated with humidity, and clouds encase them, the greater elevation of the Alpine range presents a very different train of phenomena; the stratus form of cloud may be reposing at the base of the mountain, and a brilliant sky be discerned from its summit, and what falls on the mountain top as snow, may assume the feature of a deluge of rain in the plain: we may therefore, it is obvious, rise above the vapour

plane and defy its influence. Alpine weather is subject to very sudden changes: thus M. De Luc's Hygrometer has announced extreme dryness, and on a sudden become bedewed with moisture. Sometimes the coming storm is announced to the hunters by the sudden trepidation and flight of the chamois, which congregate often in herds of forty or fifty together. It may be observed in this place, that radiation is not so great from an inclined plane, *cæteris paribus,* as from a horizontal surface; this being the case, the inclined sides of the mountain range will not be so chilled as the surface plane of the valley, the consequence of which is, that the vapour precipitated from the atmosphere will be more copious and dense in the plain than on the sides of the hill: on great elevations no dews form, because the air is there void of vapour chemically suspended in it, and the point of saturation is not reached. A north and south aspect will also much modify the circumstances.

The valley environed by hills of inconsiderable altitude will, consequently, be more susceptible of the effects of radiation than the latter can be, and hence it is notorious that dew and hoar frost are more abundant in the plain than on the summits or acclivities of hills. This circumvallation, by promoting the tranquillity of the air incumbent on the surface of the valley, will in like measure aid the process of radiation. Radiation, doubtless, goes on on the slopes of hills; but by a statical law, the mass increased in

density by condensation will sink into the valley, and repose at the foot of the mountain. It has been long remarked that the malign effects of cold, and the injury it inflicts, occur in hollow places, sheltered from the usual contingencies of sharp winds and other adventitious sources of cold, while the steep, visited by cold currents of air, presents no such injurious effects of cold. Mr. Daniel states that he has seen a difference of 30° on the same night, indicated by thermometers placed under these various circumstances. This is certainly a very extraordinary difference, but we cannot doubt the fact when stated by so accurate an observer.

A marine atmosphere has not been duly estimated, and we suspect that the sea voyage has as much to do in restoration as the climate. Though a change from a warm to a cold region be one in every respect fraught with danger to the invalid, yet it is notorious that a voyage,—for instance, from Britain to St. Petersburgh,—will prove exceedingly beneficial. Dr. Clark says that the West India Islands are too hot for invalids that are Consumptive, and that the Azores, Bermudas, and Bahamas are all inferior to Madeira; and yet it is a fact, that individuals have been benefited by the voyage hither. It cannot well be considered as proceeding from any thing like a reaction in the system, from nausea or sea sickness, as benefit has accrued in cases where neither the one nor the other has occurred. Dr. Clark seems to think a sea voyage, in early stages, when the

disease is accompanied with hæmoptosis, beneficial, and if we understand him aright he places the chief, if not entire efficacy in the *motion* of the ship, and fences his own opinion by a similar one entertained by Dr. Gregory, assimilating this continued motion to constant exercise, while it also acts on the nervous system. He gives a preference to the Atlantic over the Mediterranean. We cannot see the force of this reasoning, though ingenious enough; for gentle exercise on land has produced no benefit whatever, where a sea voyage has done much good. It is well known that small doses of ipecacuanha have, when exhibited in an early stage of Consumption, effected benefit; and though a sea voyage may in some cases act on the same principle, and by producing nausea have a good effect, the chief advantages will be found, we believe, in the uniformity of the atmosphere incumbent over the sea, and which sustains a comparatively constant and uniform hygrometric character. The non-occurrence of abrupt alternations of temperature, and presence the muriates and hydriodates which a marine atmosphere is known to hold in solution, must not be overlooked in the estimate. The sanative effects of salt water, when applied to cuticular excoriations, &c. are admitted, and we cannot deny a similar action on the ulcerated lungs, when such an atmosphere is in the act of respiration brought in contact with them. Vogel and others have clearly proved that the atmosphere incumbent over the ocean contains muriates in solution, and the very

attenuation which attends their wide diffusion through the air, would afford more ready means for its introduction by respiration. In the Mediterranean we have often determined the fact, and during a perfect calm on the Breakwater in Plymouth Sound last summer, our experiments detected in the incumbent air carbonic acid, muriates, bromine, and iodine. Our method was to empty a flask previously filled with distilled water, with the exception of two or three ounces, and repeatedly, for a continued period, agitate the included atmosphere in contact, opening the flask at intervals for a fresh accession. This being evident, the benefit of a sea voyage is no longer a problem, and though the seas of temperate climes may prove beneficial, it is obvious that those of tropical regions, from the more brisk evaporation, and consequently more constant and continued accession of saline matter, will be proportionably more sanative. It is generally believed that "colds" are not so readily caught at sea, even though the sea spray may drench the individual; and this position, which is granted, is easily explicable, when we consider that the system cannot be so chilled by evaporation as must be the case generally on land, because the hygrometric state of the atmosphere would considerably modify this process. That muriates are contained in a marine atmosphere, is evident from the *rust* which encrusts the iron furniture of a ship, even below deck, and chemical means will detect muriate of iron in this rust. It is known that if a bit of

cloth or sponge previously well washed with fresh water be hung up, between decks, it acquires a salt taste. Mr. Wilson* says, "we have known an instance where a person soon got well at sea, but by residing on land the complaints returned, and on going to sea were again removed."

The electric state of the medium in a marine atmosphere will also be much more equable, and less susceptible of vicissitude; and, according to Mr. Black, winds or currents of vapour of some continuance from an extent of sea are negatively electrical, while those from the land, especially from hilly districts, are relatively invested with positive electricity. These remarks apply to observations made in the Mediterranean. In the middle of the Atlantic ocean, lightning is seldom seen.

The influence now stipulated will be found more or less effective in the atmosphere of the sea-coast, for there the air will be charged in a greater or less degree with muriates. Hence black hats and clothes lose their dye, and become brown from the decomposition of the dye (gallate of iron.) The muriate of iron, which is brown, will be formed at the expense of the chemical decomposition of the black dye, on the principles of complex affinity. It has been said by Dr. Harwood, in his remarks on the climate of the southern coast, that animals thrive where vegetables decline, and this consequently happens on the sea coast. This is rather a sweeping

* Observations on Climate, p. 221.

generalisation, because the rule will by no means hold good; it altogether depends on the prevalent winds to which the vegetation on the sea coast is exposed. Thus Von Buch says that where neither the spruce nor pine thrives, and vegetation is at a low ebb, man seems equally defective. The fact is, we are convinced, that the sea air very materially influences the effects of radiation. Crops on the sea shore, such as barley, are sooner matured than inland crops, and, while intense winter frosts utterly destroy inland vegetation, those on the borders of the sea will escape and outlive the severest season. We have now a luxuriant plant of the *Phormium tenax,* or New Zealand flax, that has outlived four winters on the sea shore, and has never been protected in any way, and have also heard of a double flowering camelia similarly circumstanced as far north as Inverness, which has always flowered well; the orange, the fig, and pomegranate will flourish better on the coast of the Mediterranean, *e. g.* near Genoa, than on the fertile plains of central Italy.

M. Bayle, observes M. Laennec, having recorded, in his researches on Pulmonary Phthisis, the case of an individual who had all the symptoms of Pulmonary Consumption, even in the last stage, as completely cured by change of air and removal to the sea coast; and the cure of genuine Phthisis appearing to him an event altogether impossible, it was finally inferred to be a case of simple chronic catarrh: the real state of the case, however, was ascertained by the

application of the stethoscope. "J'ai acquis depuis la certitude qu'il y avait eu chez ce malade quelque chose de plus qu'un catarrh; J'ai eu occasion de le revoir in 1818; J'ai exploré sa poitrine avec le cylindre; J'ai trouvé que la respiration s'entend parfaitement chez lui dans toute l'étendue de cette cavité, excepté au sommet du poumon droit," &c.* He hence infers that this portion of the lungs had been the seat of an ulcerated cavity, afterwards supplanted by an entire and solid cicatrix. It appears that this person is now *Procureur du roi* in one of the provincial tribunals, and often speaks for an hour together without fatigue: this fact is highly favourable to a proper selection on the sea coast in Pulmonary Phthisis.

The difference between the salubrity of the country and the town is palpably seen in the florid, healthful, and happy countenances of the rustic and the villager; and yet it is equally true that the chemist is unable, with all his eudiometry, to detect in the incumbent air any difference between the one and the other. But there are subtile agents at work which his apparatus can neither catch nor confine. The gases may be considered the same proportionally, in some measure, but a closer inspection will, perhaps, even yield evidence of a check to the evil agency of a gaseous product, which, if in excess, would destroy, and even in inconsiderable quantities must prove more or less injurious; besides this,

* "De L'Auscultation Mediate," Vol. I. p. 112.

the unventilated atmospheres of large towns, loaded with an excess of carbonic acid, a due admixture of coal gas and fuliginous vapours, and the effluvia of sewers and drains, *et hoc genus omne,* must supply such a host of deteriorating materials as to make it matter of wonder how the organs of respiration can be assailed so long with impunity. Not to mention that the rural retreat is free from all these rude injuries, the country superadds the influence of healthy vegetation, which, besides its electric and hygrometric functions, pours out on the atmosphere floods of oxygene to neutralize the excess of carbonic acid gas arising from respiration and combustion.

That plants do ameliorate the atmosphere contaminated by the respiration of animals seems very evident, and though some, and among others Mr. Ellis, of Edinburgh, have endeavoured to prove the contrary, we imagine that a very different view of the case can be substantiated by facts. Dr. Priestley conceived that leaves imbibed carbonic acid gas by their upper surface, and evolved oxygene by the under surface; Ingenhouz discovered that light was essential; while plants gave out carbonic acid gas by night, and Sennebier found that the quantity of oxygene was in some corresponding ratio with the volume of Parenchyma. Those who have taken opposite views have apparently overlooked the influence of aquatic vegetation, such as the water lily, pond-weed, and others; and we believe it is tolerably well ascertained that fish thrive better in ponds mantled

with acquatic vegetation than when naked. The influence, however, of the dytiscus marginalis in thinning the young fry, and devouring the spawn, must be duly considered and allowed for. Gay Lussac seems to have ascertained that the air in water contains 32 per cent of oxygene, while atmospheric air is known to contain only 21 per cent. The conferva rivulosa and others display by the silver air bells which attach to their grass-like stems the evolution of oxygene, and the conferva bullosa receives its specific character from the vesicles inflated with oxygene, that buoy up the plant on the surface of the water. Sennebier found that plants watered with carbonic acid gas respired an extraordinary quantity of oxygene, and Ingenhouz in one experiment discovered, that a vine leaf placed in an ounce phial of carbonic acid gas in the sun beam without water, changed it in an hour and a half to pure oxygene. In experiments where imprisoned vegetation was watered with carbonic acid gas held in solution, Sir H. Davy found that the air became eudiometrically pure. An officer long in India informed us, that he had always found the land breeze 4 per cent purer than the sea breeze.

It is readily conceded that carbonic acid evolves from plants at night, and that while the exotics of the conservatory may prove, if introduced into the drawing-room, salubrious by day, they must be noxious at night, still the ratio must be widely different in these cases, and if the carbonic acid gas evolved at night

had any correspondence with the amount of oxygene emitted by day, it may reasonably be asked, whence comes the carbon essential to the ligneous structure of the plant, and which forms so vast a proportional of the mass? Besides, the carbonic acid which evolves at night will from its superior specific gravity, being cooled, fall on the earth and be absorbed; and that which transpires from the leaf, being condensed still further by the night dews which fall, will trickle to the ground, and water the earth with that which appears to be taken up by the roots of plants. Thus the atmospheric salubrity will scarce be disturbed by the carbonic acid gas which transpires at night, but it must not be forgotten that animals expire this deleterious gas by *day* as well as by night, and as it must be considered to be chiefly destructive to respiration during day, when its buoyancy is determined by temperature, it is at this precise period that vegetation interposes, and by its surplus of oxygene restores the equilibrium and reciprocates the compensation essential and required. When our fields and forests are denuded, salubrious breezes borne from tropical lands and a perennial vegetation will supply the want we then feel, though the desideratum will be less from the increase of cold, which will proportionally check its diffusion and diminish its buoyancy. This reciprocity between the animal and vegetable kingdoms is not the least of the wonders which invest creation, and excite our admiration of its almighty Author. Neither the one nor the other can therefore say to his

fellow—" I have no need of thee." The plant purifies what the animal poisons; what the animal elaborates sustains the plant in healthy vigour, and it, in grateful return, yields for every measure of carbonic acid an equivalent one of vital air. When we contemplate the picture drawn by the sacred historian of the sublime *hexäemeron* of creation, we shall find that the surface of the ground had become instinct with botanical glories, and the sun too had played on the leafy scene, before animal life had yet breathed either by lungs or gills; the counterforte and antidote were prepared before the poison had been elaborated.

CHAPTER IV.

CHEMICAL CONSTITUTION OF THE ATMOSPHERE—PHENOMENA OF RESPIRATION——ARTIFICIAL ATMOSPHERES——THEIR EFFECTS—OXYGENE—NITROUS OXYDE—CHLORINE—NITROUS ACID GAS.

The atmosphere which sustains respiration is a compound aërial medium; its proportional constituents, chemically considered, are twenty-one per cent. of oxygene, and seventy-nine of azote or nitrogene, which last is the base of nitrous and nitric acids, as well as of some compound elastic gases. To these must be superadded one part in 600 to 1000 of carbonic acid gas, according to Sir Humphry Davy and Mr. Dalton; others have stated it to form a greater proportional, and this variability would seem to substantiate the belief that it obtains in the character of a mechanical mixture rather than as existing in atmospherical air as a definite chemical ingredient. On the other hand, when we consider its great specific gravity we find not a little difficulty in this supposition, since atmospheric air, compared with carbonic acid gas, will be as 1000 to 1500. That atmospheric air does contain carbonic acid is clearly proved in the opaque pellicle or film which pervades the surface of transparent lime water when

exposed to atmospheric influence; and this phenomenon has been noticed in frigid, temperate, and tropical regions in every season, and at different elevations. Theodore de Saussure found carbonic acid gas on the Col de Geant and on the summit of Mont Blanc; and Humboldt on the highest elevation he attained on the acclivity of Chimboraço, the highest of the Andes. We have in numerous experiments determined its presence on the loftiest eminences of some of the Passes of the Alps—the Great St. Bernard, Simplon, and Mont Cenis. We have also found it in the atmosphere incumbent over the Breakwater in Plymouth Sound, and that of the Mer de Glace, near the lofty glaciers of Talefre.

We have already stated the chemical parts of the atmosphere, irrespective of carbonic acid as an ingredient, and these proportionals are found invariably every where, unchanged by any vicissitude, and unaltered by any alternation. A portion of atmospheric air, brought from the coast of Guinea, eudiometrically examined, discovered the same ratio as that obtained from over the island of Britain. Whether on the sea-coast or inland, at whatever season or period of the day, independent of barometrical pressure or thermometrical change, the relative ratio of any specific quantity will be still the same. Gay Lussac, in 1805, attained in his balloon an altitude of 21,750 feet, and brought down from that elevation a portion of atmospheric air, which when analized discovered the same relation of chemical structure.

We should certainly infer, *prima facie*, that the atmosphere is unquestionably a distinct and definite chemical compound, and yet some have asserted that it is a mere mechanical mixture: the relative specific gravities of oxygene and azote are 1.1111 and 0.9722, and as far as this determines the question, taking also into consideration the invariable and unchangeable proportions in which they are found united, we are inclined to consider that the testimony is in favour of a definite chemical compound. On the other hand, Mr. Dalton's experiments clearly prove that elastic gases in contact and incumbent, mix together, or mutually penetrate. If the invariability of these definite parts, however, be rejected as a proof of their chemical constitution, we have no evidence for the chemical structure of any compound gas whatever, since we give up the only test which can determine the question. It is not denied that gases can and do mingle together, but if the link of union be a mechanical attachment, how comes it to pass that it possesses all the determinate features of chemical affinity? The most curious example of the transit of a gas by the orifices of organic tissues, is what takes place when a bladder, containing a small quantity of hydrocarbonate, is suspended in a vessel of carbonic acid gas; the bladder, flaccid at first, gradually expands till it at length bursts. We found a similar transit, by interposing a fine membrane between two elastic volumes of hydrogene and carbonic acid gas, contained in glass cylin-

ders, and incumbent over each other. Caloric acts an important office, but will scarely account for the invariability of parts. A reversal of these proportionals, still preserving the same constituents, would form *nitrous acid gas,* or aquafortis! a fact not the less true because it is extraordinary, and exhibits a proof how very soon a blessing might be converted into a destroyer. From these remarks it is obvious, that however the atmosphere may affect the living functions, no blame can be put on the chemical constituents of the atmosphere, and the question of inquiry is only to be considered in relation to the moisture it may contain, together with its electric and thermometric character, and the heterogenous materials that may be mixed with it.

Respiration is one of the most important functions of animal life, and whether the mechanical structure of the Pulmonary apparatus, or the chemical effects produced by their action be considered, the phenomena are interesting, curious, and wonderful. It is, however, only the chemical relations which principally affect the present inquiry. At each inspiration a portion of atmospheric air passes into the lungs; being introduced into the air cells, and brought in contact with the blood, the latter is depurated, yielding up its superabundant carbon to the oxygene, which, being thus changed into carbonic acid gas, is expelled by each succeeding expiration, and this newly-formed feature is at the expense of a definite proportional of oxygene, which disappears, the car-

bonic acid being an exact equivalent for the volume of oxygene which is thus eclipsed. From this view of it, as generally entertained, we are entirely dissentient. Nothing is more decidedly proved, than in the process of respiration an equivalent volume of carbonic acid gas is returned for that of the oxygene, but we cannot so well understand how the combination of the carbon of the blood with the oxygene of the atmosphere, should be so instantaneous and complete with the intervention of a delicate film between them: though we can at once conceive the complete interchange through such a tissue of oxygene, absorbed by the blood, and carbonic acid gas evolved in return. In respiration, the volume of the newly-formed carbonic acid gas amounts to four and a half to eight per cent. of the whole elastic mass, which, however, as Dr. Prout has shown, is modified by circumstances. The quantity of carbonic acid gas is diminished, for instance, when mercury or spirits have been used. It varies before and after meals, and differs at night compared with day. The experiments of Dutrochet and others serve satisfactorily to elucidate the point. The existence of carbonic acid gas in the blood has long been clearly proved. Dr. Edwards,* whose experiments on respiration are extremely interesting, states that carbonic acid gas does not form instantaneously in the lungs through the medium of respiration, but that it is secreted from the blood in the

* Revue Medicale, Aôut, 1823

respiratory organs. We are far from thinking his experiments conclusive, because they were made on cold blooded animals, placed in an artificial medium of pure hydrogene. Under such circumstances, however, by sustaining the process of artificial respiration, carbonic acid gas was excreted, nearly equal in quantity to what had taken place in atmospheric air. We made an experiment which goes far to prove the condition for which we contend: recent venous blood at 98° F. was enclosed in a tube formed by the portion of the allantois of a calf, and the tube being plunged into a medium of oxygene, an absorption of the gas took place, the blood became florid, and the ambient medium, in process of time, evinced distinct and unequivocal traces of carbonic acid gas. Dr. James M'Donnel, of Belfast, who has for many years made experiments on numerous individuals in health and disease, adults and young, and at various periods of the day, informed us he had found considerable uniformity in the results, cæteris paribus, with the exception of females *enceintes*, in which in the earliest stage a remarkable excess of carbonic acid gas was determined,—a fact which powerfully corroborates our view of the phenomena,—because the increased aëration of the fœtus demanded the condition. It is obvious that these views being sustained, the maintenance of animal temperature cannot be explained, according to the views of Crawford and others, on the principles of latent caloric; we are entirely of opinion with Mr. Brodie, whose experi-

ments we have considered satisfactory and conclusive, and therefore accept his verdict as confirmed, that "animal heat is in some way or other dependent on the integrity of the nervous system." Thus, though artificial respiration was kept up in an animal that had been decapitated, no heat was evolved. A halitus, or aqueous vapour, is also in the process of respiration secreted from the mucous membrane of the bronchia, and accompanies the evolution of the carbonic acid gas, residual oxygene, and unchanged measure of azote. By the action of the lungs the functions of the heart are put in motion, and with it the machinery of circulation: and the venous blood, dark in colour, being transported to the lungs, gives up its excess of carbonic acid gas, and receives in return an equivalent balance of oxygene, and flushing with a vermilion dye becomes arterial blood, and circulates again. As far as we can trace the phenomena, the azote serves the purpose of a diluent, or corrective, to the too stimulating power of the oxygene with which it is associated, since experiment has not determined that any change or absorption takes place; and yet we suspect that a new chemical combination may be formed by another ratio of proportionals, and thus act in some yet undetermined character. The increased pause which takes place in the process of respiration, between the period of the expulsion of its produce and the moment that a fresh inspiration is made, is very remarkable and full of interest: it is sufficient to allow for the ascent

of the azote and descent of the carbonic acid, agreeable to their respective specific gravities, and thus permit in the subsequent inspiration an uncontaminated influx of atmospheric air. This prolonged pause, of which we are generally unconscious, depends on volition, and its periods are repeated without consultation. In no department of animal physiology are more wonders revealed than in the conjoined functions of respiration and the circulation of the blood. The mechanism of the nerves is more occult, and their operations more mysterious and subtile. The whole process of digestion seems to be subordinated to the influence of nervous agency, and we think that the experiments of Dr. Wilson Phillip and Mr. Broughton go far to prove, that if the power resident in the nerves be not the principle of voltaic electricity it is very similar to it, and exercises analogous functions: the evolutions of heat and processes of digestion are precisely the operations that such an agent is capable of performing. It is of the first importance that we should clearly understand the phenomena of respiration, and the changes superinduced on the blood by aëration.

Dr. Hales calculates the number of respirations in a minute to be twenty. Dr. Menzies breathed only fourteen times in this period. Sir H. Davy estimates his respiration at about twenty-six times in a minute, while Dr. Thomson states his at nineteen. *Twenty respirations* in a minute may be justly assumed as the average.

Dr. Menzies estimates the quantity of air inhaled at each inspiration at forty cubic inches. Allen and Pepys state it to be 16.5 cubic inches, in an ordinary inspiration, while the expiration is calculated, in a case of slow and full breathing, at 61 cubic inches. Dr. Bostock presumes that about forty cubic inches are inhaled or expelled in the act of respiration. *Forty cubic inches* may be concluded on, as a near approximation to truth.

Dr. Godwin infers that the mean quantity of air remaining in the lungs, after expiration, amounts to 109 cubic inches. Menzies states it to be, after an ordinary expiration, 179. In the same circumstances, Sir H. Davy estimates it at 118 cubic inches. Allen and Pepys found nearly 100 cubic inches of air in the lungs after death: being an average of 126.5 cubic inches, to which Sir H. Davy's estimate is a near approach; and 120 cubic inches may be safely considered the general average.

From the experiments of Menzies, Crawford, Davy, Dalton, and Allen and Pepys, it seems to be clearly ascertained, that for the oxygene of the atmospheric air which has disappeared in the act of respiration, *an equal volume of carbonic acid gas* has been substituted, amounting, according to the experiments of Messrs. Allen and Pepys, to *about* 27.5 *cubic inches per minute.* Dr. Prout has deduced the mean or average at 3.45 per cent. of carbonic acid gas.

Dr. Hales estimates the quantity of *aqueous vapour*

emitted in respiration, at 20.4 ounces per day, and Dr. Thomson at nearly 19 ounces.

Sanctorius used to weigh himself, in order to calculate the loss sustained by the system at different periods. This loss is not by any means equable, since it is variable both by day and night. The causes are very diversified: temperature, pressure, moisture, and dryness;—a tranquil or agitated atmosphere, and light and electricity may be superadded to these.

Artificial atmospheres, in relation to respiration, form a subject of great interest in Pulmonic disease, and constitute a question of the very first importance. There are not many of the gases that can be inhaled, even for a short time, without admixture with others. Nitrogene is utterly irrespirable, except in combination with oxygene, forming for instance the protoxyde of azote or nitrous oxyde. It may be respired, and its effects are very extraordinary.

Oxygene was discovered on the 1st August, 1774, by Dr. Priestley, and by the Swedish chemist, Scheele, about the same time: it is a permanently elastic gas, similar to atmospheric air, of which it forms a part. When inflammable bodies are set on fire and plunged into this medium, such as charcoal, sulphur, or phosphorus, they burn with increased intensity and splendour, and when bodies absorb it, they may assume an earthy appearance, or become acid. This gas, when made to impel the flame produced by burning spirit of wine, on the diamond, is found

sufficient for its combustion, and when a series of jets are thus directed from various points of a circle surrounding a ball of quick-lime, placed in the centre, an intensely brilliant light is obtained. This artificial illumination has been found serviceable in the measurement of the base of the triangle in the grand trigonometrical survey, and might be eminently useful in telegraphic communications by night; the periods of intermission employed would form a very simple cypher. We can have no doubt that this light could be descried by a good telescope at a distance of upwards of a hundred miles. Oxygene is a fraction heavier than atmospheric air, and there are few bodies into which it does not enter as a constituent part. It seems clear from the experiments of Count Morozzo and others, that it is quite unfit for respiration. Birds and other animals quickly die in oxygene, and it is remarkable that the gas is scarcely deteriorated by animal respiration; no other proportions whatever than those we find in atmospheric air, of oxygene and azote, would support a continuance of healthful animal life. This gas is obtained in its purest form by exposing the chlorate of potassa in a small glass retort over the flame of a spirit lamp, and receiving the gaseous product over water.

We have the following interesting case stated in Professor Silliman's American Journal:—A young lady, apparently in the last stage of decline, and supposed to be affected with hydrothorax, was pro-

nounced to be beyond the reach of ordinary medical aid, when it was determined to try the effects of oxygene. The gas, it appears, was obtained from nitre, or nitrate of potassa, not because it was best suited, but because it was most convenient: of course the gas so obtained must have possessed a variable portion of nitrogene or azote—perhaps seventy to eighty per cent. of oxygene, and twenty to thirty of nitrogene. This being the case, in all probability the latter may have very materially influenced the results, and the produce of nitrous acid in the bronchia have resulted; and it might be cited as a proof of the efficacy of our plan of treatment, in the use of an atmosphere impregnated with nitrous acid gas. However, the detail states that the gas was skilfully prepared and carefully administered; and it appears that, contrary to all expectation, the difficulty of breathing, and other oppressive symptoms, were speedily relieved,—the lady grew rapidly better, and in a few weeks entirely recovered her health.

Nitrous Oxyde, or protoxyde of azote, was discovered by Dr. Priestley in 1772. Its constituents were first pointed out by the Dutch chemists, and its pecular properties, in reference to respiration, investigated by Sir H. Davy in 1799; when nitrate of ammonia, in a solid or crystallized form, is subjected to a temperature of 300° to 500° F., the gas distils over, and though it is slightly absorbable by water, it may be collected over its surface. It is quite transparent and invisible, except when combined with

aqueous vapour, in consequence of a too rapid evolution proceeding from an increased temperature, when it assumes the form of a white cloud, which however soon condenses. In this gas, as in oxygene, there is an increased intensity of combustion when inflammable bodies, previously ignited, are plunged into it. Inflamed sulphur and sulphuret of carbon, however, exhibit a beautiful rose-coloured fringe. Sir H. Davy first made us acquainted with the extraordinary powers it possesses in respiration, when three quarts to a gallon or more are inhaled: we have given to the amount of two gallons of this gas to an individual, but are decidedly inimical to its frequent, general, or indiscriminate exhibition: indeed, we doubt the propriety altogether of exhibiting the gas, excepting under peculiar circumstances. Some, indeed, make no scruple of giving it on every occasion, and to any individual who may rashly offer to take it, but it has produced a temporary madness, and transient apoplexy, and where there is any determination of blood to the head, its exhibition might prove fatal. Prudence and caution, indeed, should attend its administration in all cases. While under its influence "the objects," says Sir H. Davy, "became bright and dazzling, and my hearing more acute." Southey describes its effects as a passage to Heaven highly pleasurable, attended with a peculiar thrilling. In an ecstacy of delight, he has attuned his lyre in its praise, and considers that the celestial atmosphere must needs be compounded of it. Dr. Beddoes said

that since he inhaled it his morning alertness equalled that of a healthy boy, and it might even make us wholly dispense with sleep. M. Pictet declared that his head appeared to be thrice its usual size. "I believed," says he, "I had quitted this world, and was floating in the empyreum." In truth its witchery exceeds by far the phantoms of the opium eater, and all his imageries and enchantments. It generally leaves no lassitude behind, and in this differs essentially from other stimuli. It had a most extraordinary effect on a gentleman to whom we last administered the gas—his leaps and springs were quite surprising: sometimes he would spin round on his heel like a top, vault into the air, and then strip and assume the attitude of the pugilist: it required several persons to prevent him from doing mischief. The effects seldom last above ten minutes, and leave the individual as before. The gentleman to whom we exhibited the gas in this case, though rather of a fevered temperament, experienced during the entire following day an extreme chill in the tips of his fingers. A rapid succession of ideas, an extreme acuteness in the sense of hearing, high muscular excitement, and vivid mental vision are its usual concomitants, though not invariably, and on some it has no effect whatever. We suppose Dr. Beddoes had something of this kind in his head when he wrote to one of his friends, (and who mentioned the circumstance to us) in the following laconic strain: "I have just discovered the springs of life." In a

month afterwards Dr. Beddoes was no more. The vapour of sulphuric ether much diluted with atmospheric air produces an effect analogous to nitrous oxyde when inhaled, but sulphuric ether has been exhibited in Pulmonary Consumption without any good effect whatever.

CHLORINE is the characteristic name given to a gas discovered by Scheele in 1774. It is the oxy-muriatic acid gas of former chemists, the chlorine of the new nomenclature, and the "bleaching gas" of the manufacturer. It is best prepared by the more direct method of adding muriatic acid to peroxyde of manganese in a glass retort, when the gas may be expelled by a gentle heat, and collected over water. Chlorine possesses a *green* colour, as its name imports, and its specific gravity is four times greater than that of oxygene: a small portion of it allowed to escape into an apartment may be breathed: it is only, however, when atmospheric air is slightly impregnated with this gas, that it is at all tolerable, for when unmixed its effects are very violent, and even frightful. Peletier fell a victim to its inspiration, and we have seen a person who had accidentally inhaled a portion of it from a large stoppered phial, completely convulsed, and his face become quite black. On the other hand, we have observed the most extraordinary effects follow its cautious administration in catarrhal and Pulmonic inflammation, and in one case, a gentleman who had suffered for many years under asthma was com-

pletely and permanently cured, by having been in the immediate vicinity of a quantity of this gas, which escaped on overturning undesignedly a cylinder containing it, left standing over the shelf of the pneumatic cistern. When the dry hand is immersed into this gas a glow of warmth is immediately felt, and proves a specific action on the skin. The fact was pointed out by Dr. Hare, of Philadelphia, and we clearly proved subsequently that the phenomenon was entirely unconnected with any condensation of hygrometric vapour in the atmosphere, or in contact with the cuticular surface. Its healing properties, when applied to sores, are sufficiently notorious ; the abraded and excoriated skin soon granulates under its influence, and we have been often indebted to it for relief in inflammatory sore throat and Pulmonary attacks: indeed, we have been in the practice of using it from time to time since 1818.

The effects of chlorine in arresting contagion and destroying infection are very remarkable. Guiton de Morveau's Preservative Phial evolves chlorine: this apparatus has been much improved by M. Boulay, and is generally employed in the hospitals of France. De Labarraque's disinfecting liquids are compounds of chlorides of lime and of soda; and it has been recently proved that even clothes infected with plague, when rinsed in either the chloride of lime or chloride of soda, become innocuous when worn. The process of putrefaction is arrested, and decay stopped in its career.

Septic poisons are decomposed and rendered harmless, and thus is a safety screen interposed between us and death. Hudson's chemical bleaching liquid, and the *Eau de Javelle* of France, are solutions of chloride of lime. Fincham's solution of the chlorides of lime and of soda, as recommended by De Labarraque, are the best we know; they are faithful preparations, and, what is more, they are of a certain determinate specific gravity, which enables us more distinctly to judge of their powers and action. No family who consults its safety should be without the solution of chloride of lime. Should typhus and scarlet fever assail it, or any other contagious disease, for some diseases *are* contagious, (a position we could unequivocally demonstrate were this the place,) this would be a safety shield. In fœtid and noxious smells fumigations of vinegar and camphor are worse than useless, since there is more than analogy to prove that their direct tendency is, by presenting subtile vehicles, to promote a more immediate, complete, and determinate absorption: they may envelope the poison, but do not in any way alter its malignity, while chlorine and chlorides are known to decompose them. Fumigating pastiles are as bad as can be—they may be compounds of "frankincense and myrrh, and all the powders of the merchant," but their deleterious properties are not the less sure. That the direct action of chlorine is to destroy subtile septic poisons, we may infer from what takes place when chlorine is brought in contact with those mortal septic gases, arsenicated and sulphuretted hydrogene;

in the former, flashes of purplish light ensue on every bubble of chlorine that enters the cylinder, and its interior shines with the metallic lustre of deposited reguline arsenic; while in the last case sulphur is evolved. We have charged the atmosphere of a room so completely with sulphuretted hydrogene as to be almost fatal to any one who would have breathed it for a few minutes, and yet entered that atmosphere with the most perfect safety, having in our hand a vessel constantly evolving chlorine; dense yellowish clouds of sulphur floated through the atmosphere, and shortly after the presence of sulphuretted hydrogene could no longer be detected by the organs of smell.

We remember to have seen M. Thenard in the "College de France" repeat an interesting experiment of this kind: a greenfinch, on being introduced into an atmosphere deteriorated with this gas, suffered apparent death, but on being withdrawn, and its head held for a moment over a small phial containing chlorine, it immediately revived. We have repeated the experiment successfully with other birds, and in truth, from some experiments made, we are inclined to believe it has other properties than those ascribed to it, and may occasionally be used with success in rousing the powers of the system to renewed activity, as in cases of opium, &c. The remarkable action it exercises on the skin in the increment of temperature which supervenes, and its reanimation from the lethal pause which follows the action of prussic acid on the system, all tend to prove this. We cannot for

a moment doubt that chlorine in an aërial form must exercise the most decided and specific action on diseased lungs. In 1823 a medical gentleman of Mansfield administered chlorine at our particular request in a case of tubercular Consumption, where the patient was fast sinking under the disease, and had not many hours to live. The first application was unfelt by the patient, but in the second case the effect was distinctly perceived, and he said he was relieved. Of course the case was utterly hopeless, and it was merely an experiment to ascertain the effect of chlorine at the *last hour* on tubercular Phthisis ; the fungoid envelope seemed to have been thus eventually penetrated. In Mr. Broughton's interesting experiments,* where the animal died in an atmosphere of chlorine, it was found on dissection that the peculiar odour of the gas was distinctly perceptible throughout the structure of the lungs, which had thus evidently passed the epiglottis and entered the system by the air passages ; the tissue of the lungs moreover was died of a yellowish colour in consequence of the absorption of the gas. The sanative properties of dilute nitromuriatic acid, as described by Dr. Scott, and practised with success, must be ascribed in all probability to the chlorine which evolves, on mixing the two acids. Ulcers are soon granulated and healed by either diluted nitromuriatic acid or solution of chlorine, or when submitted to the direct action of the free gas.

* See Professor Brande's Journal, March, 1830, p. 150.

We made experiments by introducing animals into imprisoned atmospheric air, and by passing up nitrous gas into it, thereby converting the medium into one highly impregnated with Nitrous Acid Gas, eventually obtained complete and decided evidence of its having found its way to the bronchia. This vapour, equally effective with chlorine, possesses a very superior advantage over it, in that it can, as we have in numerous cases of diseased lungs proved, be breathed mixed with atmospheric air, without the slightest irritation being produced on the pulmonary apparatus. We have also found that it decidedly and completely decomposes sulphuretted hydrogene; and in one case the hand, which had been abraded and festered, having been exposed to the influence of the vapour expanding in a vessel, the sore soon granulated, sloughed and healed completely. In pulmonary affections, accompanied by severe catarrh, and excited by the slightest cause, the vapour gave rise to no cough whatever—a proof of its vast superiority over chlorine, since the latter might accidentally excite coughing, and be followed by a rupture of some of the blood vessels of the lungs: it was to guard against this evil that we prosecuted our researches, though we presume that the priority of suggesting and employing chlorine in diseases of the lungs has been clearly and unequivocally demonstrated to belong *de jure* to us; and, that we have not had numerous examples of complete success to announce as their triumph over Pulmonary Consumption, is to be ascribed to our not being in

medical practice, and of course not been able personally to employ them. We are sorry to add that the progress of triumph has been impeded by the tardy adoption by medical men of these remedies, because they have not emanated *ex cathedra.* We are sorry to say that there is an unhappy jealousy of this kind, too prevalent we fear, though relieved by some honourable and bright examples. But surely this might well be spared in our case—where there is not the semblance of any thing that might lead to suspect empiricism, all which pretenders we from our heart detest and abjure. In a pecuniary view, we have made numerous sacrifices, and in return have received neither fee nor reward. Add to this, we have developed such rational grounds for the adoption of the curative plans we propose, and of which we personally live to attest the benefit and the value, that we cannot conceive what reasoning could be arrayed against it. At least this is our humble conviction, and that no permanent stand can be made against its ultimate universal adoption. We have not the slightest doubt that if it be not a complete specific in Pulmonary Consumption, it approximates as near to one as can well be conceived by the human mind.

CHAPTER V.

HYDROGENE—CARBONIC ACID GAS—UNIFORMITY OF ANIMAL TEMPERATURE IN HOT AND COLD ATMOSPHERES———RELATIONS OF THE ANIMAL FUNCTIONS TO TEMPERATURE—RADIATION, ITS EFFECTS.

HYDROGENE is the lightest of elastic fluids, and constitutes two parts by volume of the constituents of water, from which it may also be obtained, for if the vapour of water be passed over iron turnings, its oxygene will combine with the metal, and the hydrogene will be developed in a nascent state. This gas however is usually obtained by the action of sulphuric acid and water on iron filings, or granulated zinc; and may be collected as it evolves from the gas bottle, and received in proper vessels over the shelf of the water bath. This gas is about fourteen times lighter than atmospheric air, and sixteen times lighter than oxygene; hence its obvious application to aërostation. Combined chemically with azote, (or nitrogene), it forms ammonia; and we have it from one of the pupils of Dr. Black, that its application to balloons originated with that eminent teacher, who inflated with it a small globe, formed of the allantois of a calf, and

exhibited its ascent to his class. It is highly inflammable, and is not absorbable by water. When equal volumes of this gas and chlorine are combined by the electric spark or inflamed, muriatic acid is formed, and with nitrous gas, in equal parts, it forms a mixture which burns, when ignited, with a green flame. This gas may be breathed for a few minutes, and possesses the very remarkable property of changing the voice, which becomes in consequence soft, shrill, and even squeaking: this curious property was ascertained some years ago at Geneva, and been since verified in this country. When the gas is allowed to escape slowly and gradually from a minute orifice, and kindled, singular intonations are produced, when narrow tubes of glass, &c. are brought over the jet of flame—a phenomenon however not peculiar to hydrogene. The most remarkable feature of this gas is the property discovered by Dobreiner of Jena, and which the phenomena described by Mr. Edmund Davy, and the aphlogistic effect of platinum wire, discovered by Sir H. Davy, and applied by Mr. Ellis, of Bath, to the "flameless lamp," might have prepared us for. It is found that if a stream of this gas be directed on spongy or finely divided platinum the mass is ignited sufficiently to kindle the jet of hydrogene. This has been elegantly employed as an instantaneous light, and the machine has been so much simplified as to make it acceptable to every one, from the ease with which it may be managed, and the certainty of its action; small balls of this spongy platinum, made up with

adhesive earth, have also been employed eudiometrically in effecting by an explosive power the immediate combination of hydrogene and oxygene. In our previous remarks, we have already adverted to Dr. Edward's experiments on respiration in this gas.

We have heard of an atmosphere impregnated with hydrogene having been successfully used in pulmonary disease, supposed to be Consumption of the lungs, and that it proved curative; we confess that it is not so obvious to our mind how hydrogene could thus prove sanative. In scrofulous disease, it is true, sulphuretted hydrogene, suspended in mineral waters, proves sanative; but it is still worthy of inquiry whether or not it be the constituent *sulphur* which is the sole efficient agent, the elastic hydrogene being an aërial vehicle, serving to subtilize it and render it more susceptible of absorption by introducing it where it could not otherwise be carried. The method adopted however in the case referred to, was to add sulphuric acid and water to zinc, contained in a convenient vessel, and this being disengaged in a close room, the individual repeatedly entered the atmosphere thus created, and remained a few minutes. It is worthy of remark that the probabilities are that the gas obtained in this way contains a small portion of *zinc*, and we know how active salts of this metal are. The gas obtained in this way certainly differs from hydrogene obtained by the substitution of turnings of iron for zinc, the specific gravity is also very different, and there are other features of distinction.

Carbonic Acid Gas is interesting, as having been the first aërial body discovered. Passing over some vague notions about it entertained by Van Helmont and others, we must ascribe the merit of insulating this aërial body as a distinct and peculiar gas to Dr. Black, who successfully effected it in 1756. Carbonic acid gas has also been called fixed air, and aërial acid, because it was found to unite chemically and intimately with quick lime, and other caustic bodies, and presented acid properties. On absorbing this gas the character of causticity is extinguished, and *carbonates* are formed. The name it now possesses is sufficiently descriptive of its character; carbon, or the base of charcoal, is one of its constituents, and in combination with oxygene, an acid is formed, while it is a gaseous or aërial body. It is very heavy, 100 cubic inches weighing 46.5 grains. If atmospheric air be numerically represented by 1000, this gas will be 1523.6. Carbonic acid gas may be procured by the action of an acid on chalk, limestone, marble, or any carbonate. Muriatic acid is that commonly employed from the extreme solubility of the muriate of lime, which is formed on the evolution of the gas. Nitric or nitrous acid would be more expensive, and sulphuric acid forms an insoluble salt; we do not mean to say that all acids would disengage the gas, for some are too weak to do it, such as hydrocyanic acid for example, but with the exception of a very few the gas may be evolved by the affusion of acids on carbonates. It is absorbable by water, but not very rapidly so, and may therefore be collected in the water

cistern. From its great specific gravity it may be obtained by being suffered to fall immediately into the receiver without the intervention, altogether, of water—it may also be laved or decanted from one vessel to another, poured through funnels, drawn off by stop cocks, or pumped out.

Champagne, perry, cider, ale, &c. owe their peculiar characters to the presence of this gas. Hence they sparkle when poured out, or a few drops of acid are added. It is found in some mineral springs. In one near Exeter we found it abundant, but the Seltzer water of Germany affords the most direct evidence of this kind. An artificial imitation of it we have in what is called "soda water," wherein the water is, by a condensing engine, made to take up several atmospheres of carbonic acid gas. This gas is fatal to combustion and to animal life, and is the "choke damp" of the miner. It is also found in caverns, wells, and mines, as well as cellars and vaults long excluded from air. It is the product of respiration, common combustion, nocturnal vegetation, and fermentation. Hence crowded rooms are extremely noxious, and when this is conjoined with the combustion of gas, oil, wax, &c. the amount of deterioration is tremendous, and utterly destructive to the healthy functions of the lungs; the theatre and the ball-room afford examples, and in these altitude will determine a specific ratio, for the boxes in the former are more insalubrious than the pit, and the galleries than either. Not long ago the atmosphere of one of

the Parisian theatres was analyzed, and the deterioraation, compared with the air without, proved to be such that it is astonishing how the animal functions could hold out against the siege; this is increased manifold by the incense of perfumes, which, though some may be able to withstand, yet others may succumb under, and we are much mistaken if the lungs will in any case play freely and healthily in a cearment of aromatic air, though fable tells us birds of paradise may breathe it among the spice islands.

The fatal effects of crowded and confined respiration were terribly proved in the catastrophe of the black hole of Calcutta, where one hundred and forty-six human beings were crowded in a cube of 18 feet. It is not many years ago since an almost similar destruction of human life took place at Malta, though the victims were young. Numerous are the accidents which occur from burning charcoal in unventilated sheds, rooms, &c. and the combustion of "blind coal." The effects of this noxious atmosphere are too plainly depicted in the pale and haggard aspects of those who are exposed to its baleful influence, such as we perceive in the individuals who frequent the coffee-rooms on the continent, as in Italy, &c. in winter, where braziers of live charcoal are introduced, there being no chimneys. Nothing contributes more to the health of Britain than the cheerful *open fire-place,* and the ventilating chimney; and, should a false refinement or mistaken idea of improvement in this wonderful age deprive us of these last props of

salubrity, the mischief that will follow must be incalculable. The constitution has to sustain quite enough in the atmosphere of towns illuminated with gas, which escapes at almost every point and pore of the pipes in every street—not to speak of its introduction into private families, the imprudence of which we imagine must be obvious to every one on a moment's reflection. Let the tide of improvement stretch far and wide, but let not its waves, when fraught with danger, invade our dwellings; better it should be stayed in some of its channels, than the purchase be made at the expense of a life of suffering or premature decay. This gas, it may be added, emerges from the floor of the *Grotto del Cane*, on the verge of the Lago d'Agnano, and we found it occupying the superior part of an ice-house belonging to T. N. Parker, Esq. of Sweeney, which we clearly ascertained to be a product of the decomposition of the straw which lined the walls of the structure, the entrance into which was from above.

This gas cannot be breathed without suffering, and almost immediate death. We endeavoured to breathe it in the case of the *Grotto del Cane* for a short period, and certainly did not experience that constriction of the glottis which is consequent on an endeavour to do so with the gas obtained in the usual way. The evolution of the gas in this rocky recess, however, is accompanied by an increase of temperature, and aqueous vapour, to the last of which we ascribed the peculiarity in question. A very remarkable pheno-

menon is described by Mr. Broughton, in reference to the animals which perished by breathing carbonic acid gas, as it appears that the temperature of their bodies in the interior was as much elevated as if they had been exposed to the *influence of fire.* The suspension of respiration has been ascribed by Dr. Heberden to a spasmodic action produced by it on the glottis, and by which convulsive action the glottis closes. This gas cannot, it must be obvious, be administered through the medium of respiration; and since it is cast off from the lungs as part of their egesta, their healthy action would be interfered with, by gorging them with what it is their constant effort to get rid of. If, however, the naked hand and arm are enclosed in an atmosphere of it, contained in an oiled silk bag, an absorption takes place by the cuticular surface, and the tissue becomes flaccid. It is in this way that carbonic acid gas has been employed in excessive excitements of the system, or in cases of extreme irritability, and the direct tendency of the gas is to allay these excesses, by acting as a sedative. Thus administered it might sometimes be serviceable in the sensitive state of the system labouring under Consumption, and in which the irritation and excitement of the respiratory organs are so great.

The functions of respiration and topics of artificial atmospheres have occupied considerable space, but they are of the deepest importance to the question of pulmonary diseases, and are the sources from

which almost all the "ills that flesh is heir to" spring, or with which they are directly or indirectly associated.

The uniformity of the animal temperature in every clime, vicissitude, season, or elevation, is not the least remarkable of the products of the animal functions. The inhabitants of the torrid zone have a similar temperature to those of the temperate and frigid zones, and the natives of Sumatra, Madagascar, and Borneo in this respect are precisely the same with those of Nova Zembla, Spitzbergen, or Greenland. The maintenance of this specific temperature within a variable atmosphere, and however chilled or heated the medium be, is a phenomenon very wonderful and worthy of admiration. The agency of the nervous apparatus is fully recognized in the support of the animal temperature, and of its original evolution, and we presume Mr. Brodie's experiments here are sufficiently conclusive; while, in all probability, the same means are employed in preserving the balance of temperature; and its auxiliary functions, such as respiration, and the transpiration of the cutis, supply their parts in the routine. The electricity of the atmosphere is the agent which restores its lost equilibrium of temperature, and tends to preserve the balance unimpaired; and the striking analogy which exists between electric power and nervous agency, goes far to confirm the conclusion. In the curious experiments of Sir Joseph Banks and Sir Charles Blagden, the system

supported unimpaired a temperature exceeding that of boiling water, and meat was cooked at their side. In the " Histoire de l'Académie royale des Sciences," we are supplied with some very curious examples of this description in the experiments made in 1760 and 1761, by Du Hamel and Tillet. The heat of the oven into which the girl entered was 260°. This female salamander assured M. Tillet that she felt no inconvenience whatever when the thermometer stood at 288°. F. being 76°. above the temperature of boiling water. She remained ten minutes in the oven heated to this point. Another girl remained about five minutes in an oven heated to 325°. The last being repeated by M. Marantin, a careful observer.

In experiments made some time ago at Paris, a Spaniard named Martinez entered an oven heated to 110° Reaumur, and ate a fowl that had been roasted by his side. His pulse beat 176°, though it was only 72° before he entered. Two French academicians saw at Larochefoucault, a man who habitually supported for 10 minutes the temperature of an oven at 112° R., in which fruits and meats were cooked. On one occasion Sir Charles Blagden remained, together with a female dog, for eight minutes in an oven heated to 100°. R.

The feats of Chaubert, yclept the " Fire-king," are of more modern notoriety. The highest temperature to which we have ever been exposed in experiment was that of a japanner's oven, which was many degrees

above that of boiling water. We felt much less inconvenience, indeed, than when we traversed the steep subterranean gallery of the baths of Nero, near Naples, where the vapour was only 98°. F. We remember also to have experienced no pain on holding the hand *when dry,* in the hot vapour which issued into the *Stufa san Germano,* and which the thermometer determined to be 210°. F., while the finger dipped in water and introduced, was scalded. The human system is not indeed exposed to atmospheres like these, though very high temperatures are often met with within the tropics. Thus, according to Adanson, at Senegal, the air in the shade is mostly heated to 94°. On the road from Senegal to Poder it is frequently 111° by day, and 86 at night. In Nigritia the sand is heated to 140° F. At Pondicherry, lat. 12°. long 67. the temperature, as stated by Mr. Gentil, during part of May, June, July, and August, was 113°. or 115°. F.; and in April 83°. to 93°. F. The coast of Quito may be stated at 90°. to 96°. On the other hand the intense cold that can be sustained by the human system is almost equally incredible. Thus in Yakutsk and Yeniseisk, in Siberia, mercury has been congealed by the natural cold, which consequently, must have been at least 39°. F., or 71 deg. below the freezing point. The mean temperature of Irkutz, from October 1780 to April 1781, both included, was 6°. 8.*

* Kirwan's Estimate of Temperature. London, 1787, p. 66.

During Captain Franklin's recent voyage, the weather in the vicinity of the Coppermine River was so intensely cold that the fish froze as soon as they were taken out of the nets, soon became a solid mass of ice, and were split open with the hatchet. In Captain Parry's case the phenomena of cold were equally remarkable. Brandy was frozen, and other extraordinary effects of the same kind were presented. Mr. Howse, an intelligent gentleman long resident among the North American tribes in high latitudes, informed us that he has experienced a degree of cold so severe that the watery vapour of respiration has frozen immediately on its expulsion, and that even under such circumstances, he has been under the necessity of walking without any covering on his head, the circulation being maintained by brisk exercise. In Bath, during the severity of last winter, the thermometer on one occasion exhibited a fall of temperature (as ascertained by Six's thermometer) equal to —18°. F., being 50°. under freezing. In the winter previous to our visit to the hospice of the Great St. Bernard, in 1825, the thermometer fell to 18°. minus zero, similar to that at Bath. The average depth of snow in winter at the hospice, is twenty feet. The lowest temperature, we believe, ever yet attained by artificial means, has not exceeded 72° minus zero, or 104° below freezing, the result of the evaporation of sulphuret of carbon conjoined with the action of the air pump.

It must be agreed on all hands that heat is an

important agent both in the prevention and cure of pulmonary disease; still this temperature must have its proper limit, and there are injurious extremes. We consider that the question rests not so much on an elevated temperature, as a well adjusted or regulated one, so that sudden transitions, at all times hostile to the constitution, may be avoided and checked; neither is it so much the cold merely as such that affects us, but it is when the air is loaded with vapour that most danger is to be apprehended, and a humid warm atmosphere is, we conceive, equally to be avoided. When the air is loaded with aqueous vapour, whether in summer or winter, respiration is more or less laborious or oppressive; and on the other hand a dry atmosphere is most compatible with the free functions of breathing; we do not speak of a perfectly desiccated atmosphere, for that would be going as much to the other extreme. Equability of temperature, with air of a specific density and certain hygrometric or atmometric character, are valuable, but chiefly if not entirely as auxiliaries to remedial measures, and as giving medicines a better chance. Artificially heated rooms have therefore been proposed as a substitute for the virtues of a warmer and less variable clime than ours, but a freely circulating atmosphere animated by the calorific and electric rays of the sunbeam is very different from a stagnant one artificially heated, and perhaps loaded with vapour. Mr. Brodie concludes that animal heat is in some way or other dependent

on the integrity of the nervous system, and that cold lessens the irritability; that it also impairs the contractile powers of the muscles, by causing a contraction of the capillaries; thus lessening the superficial circulation, and stopping the cutaneous secretion.

A number of experiments have been made in France on *ducks* and *chickens*, by M. Flourens, of which the following are the results:—1. That cold exercises a constant and decided action on the lungs of animals. 2. That the effect of this action is more rapid and serious in proportion to the youth of the animals. 3. When cold does not produce an acute Pulmonary inflammation speedily mortal, it produces a chronic inflammation, which is in fact Pulmonary Consumption. 4. That heat constantly prevents the inroad of Pulmonary Consumption; and when it has actually commenced, heat suspends its progress, and sometimes even leads to a perfect cure. 5. That to whatever height the malady has arrived, it is never contagious. We know not under what circumstances these experiments were made, for though cows and monkeys, and some few others, are known to be attacked by Consumption, we have heard, for the first time, that ducks and chickens are so; but we fear heat *alone* will never effect a cure. Doubtless, *cæteris paribus*, heat will alter the density of the atmosphere, and may render it in Pulmonary Consumption more easily respired, while cold inhaled

might, under such circumstances, from the consequent febrile excitation, prove too rude a check; besides, while the atmosphere contains humidity, which cold would tend to condense and render more tangible, it is more elastic, and might thus tend to prolong or even increase the symptoms that require a very different treatment. There is still another important function exercised by the animal frame, wherein the importance of temperature is especially concerned, we mean that of the *skin*. Checked perspiration, whether sensible or insensible, is to be particularly avoided, and if this suddenly done, in the integrity of health, gives rise to inflammatory fevers and the like, it must, in Pulmonary disease, where there is already superinduced a morbid action of the skin, prove still more injurious. The profuse perspiration which is declared in the second stage of the disease, seems to indicate a struggle and endeavour of nature to relieve herself in that way. To assist the functions of the skin therefore, and prevent any check to their proper action, is obviously an important desideratum, and perhaps the benefit of a warm clime may tell in this direction as much as in any other. Dr. Keil and Dr. Hales found that in twenty-four hours a man lost by perspiration thirty-one ounces; six of which were evolved by expiration. Any thing that would impede or altogether prevent the free exercise of these functions, so important and essential to health, would, it is evident, be extremely injurious: a cold atmosphere would do this, and a warm medium on the other hand

would facilitate their more free action. Transplantation to a warm clime may suddenly reanimate the system, as a plant sinking in decay rallies and revives again when taken from the chilling vicissitudes of the open air and transferred to the hot-bed or the stove.

Clouds are the great check to radiation, for they intercept the heat that would otherwise escape from the earth to the heavens; a clear sky and still atmosphere are conditions necessary to its full efficiency, and the loss of temperature will be found proportional to their prevalence. We feel persuaded that more catarrhal affections are attributable to this cause than even to cold produced by evaporation. It is important to remember that any veil drawn over the spot will altogether prevent the loss of temperature which might be sustained from this cause. The formation of dew is entirely and satisfactorily explained on these principles; the heat radiates in a calm night to a clear nocturnal sky, and the surface from which it emanates being chilled, the vapour in contact is condensed, and deposits its moisture; cold is therefore a previous occurrence, but on the instant that the vapour condenses into dew, heat is evolved. The maximum degree of cold therefore depends on two conditions, a perfectly cloudless sky and completely tranquil atmosphere. The intervention of clouds interrupts the cooling process, and the breeze dissipates the already formed moisture, or prevents its formation altogether. Hoar frost may be considered as congealed dew; and neither the one nor the other will

form during cloudy weather, or when winds sweep the plain. It is thus that Dr. Wells, in his "Essay on Dew,"* has proved to demonstration that the combined circumstances, to which we have alluded, favour or interrupt the production of dew; and its formation is therefore similar to that which gives rise to the deposit of a film of aqueous vapour on the exterior surface of a glass vessel in a heated room, when cold water brought immediately from the spring is poured into it. Hence the formation of ice in the upper provinces of Bengal, in porous earthenware pans; these pans, supplied with water, are laid on dry straw or brushwood, to cut off, by their non-conducting character, all communication with terrestrial temperature, and allow radiation its full scope. The shelter of some jungle is selected for this purpose, and a square space excavated for the pans and brushwood. We are informed by a gentleman who was one of thirty, supplied from this source alone with from twenty to thirty pounds of ice each alternate day as his proper share, that they were never disappointed in obtaining a sufficient quantity of ice, provided the sky was clear and a settled calm prevailed, even when the temperature of the atmosphere was 47°. Hence, though the atmosphere of an Italian clime be high in its general temperature, the ground may be excessively chilled by the brilliancy of its sky and the repose of the atmosphere. Thus do the plains of Piedmont and Lombardy suffer severely in winter, and the orange tree, which

* London, 8vo. 1814.

would flourish on some slope in the amphitheatre of Genoa, would perish in the vicinity of Turin. Thus, too, malaria stalks triumphant where the system is immersed in a shroud of vapour, and which condensing, settles on the plain, because it is thus exposed to the full amount of the chilling effects of radiation, and this will be found in marshes and swamps in its maximum grade of malignity. The intermittents of our fens is only a milder type of the malaria of the Pontine marshes or the Campagna di Roma; and as the drainage of our fens has chased away endemic agues, so the cultivation of the Campagna deserta of the Imperial city would have its due influence on the incumbent atmosphere, and those who might dwell there. It is known, for instance, that if the surface of a soil is frequently stirred by the hand of art, it is less susceptible of being affected by drought; and the spade and the plough, with an evergreen livery of vegetation, in a judicious routine of crop, conjoined with clumps of trees planted here and there, to attract and condense moisture, would soon reclaim that territory from its sterility, even in despite of the *Lago di Tartaro,* which occupies a niche of this district. Rome itself would feel the benefit of the change in the article of health. The Roman territories might soon become as exuberant, bountiful, and salubrious as the kingdom of Tuscany. In the last case industry has put her shoulder to the wheel, while idleness and *ennui* brood over the Papal soil.

To reclaim the melancholy waste presented in the Campagna di Roma, chequered only by the ruins of Claudian's aqueduct, and which contains neither tree nor hedge, some have proposed to plant olive trees, and others mulberries ; others sagely recommend *paving* the Agro Romano, and one Cardinal advocated the pasturage of sheep and black cattle.

From the preceding observations it will be at once apparent what danger we incur in our transit from the roofed domicile into the atmosphere, for even if the temperature of the air within and without were precisely the same, the system would be chilled to freezing by radiation in a clear sky; and the difference between a clear aspect of sky and one obscured by clouds is sufficiently remarkable ; our feelings under such circumstances will determine the question whether clouds be floating over our head or the sky be clear and cloudless, without the trouble of looking upwards.

CHAPTER VI.

CHLORATE OF POTASSA; ITS MEDICAL EFFECTS ON THE SYSTEM—CONTRAST WITH DIGITALIS—OBTAINMENT AND PRECAUTIONS IN THE APPLICATION OF CHLORINE AND NITROUS ACID VAPOUR—EFFICIENCY, CONJOINED WITH CHLORATE OF POTASSA IN PULMONARY CONSUMPTION—PRACTICAL ILLUSTRATIONS—CONCLUSION.

Perhaps one of the greatest desiderata in Therapeutics is that of a medical agent, which, while it subdues the inflammatory tone of the pulse by lowering the rapidity of the circulation, may not at the same time reduce the strength of the patient. Thus *digitalis*, though ofttimes very equivocal in its action, while it lessens the pulsation, is attended by a fearful and painful prostration of strength, so that the individual almost wishes death would put an instant period to his sufferings. A happy substitute for this agent, if we mistake not, will be found in Chlorate or Oxymuriate of Potassa. When in Paris in 1818, we filled up our leisure hours with translating Chaussier's work, entitled "Contrepoisons,"* the second edition of which had then been just published. What more immediately engaged our particular attention was the recommendation by the author of the

* H. Chaussier. 2d Edition, a Paris, 1818.

employment of Chlorate of Potassa, in cases of contusion by violent blows and falls, and in croup. It is important to the present question to quote the precise words of the author: "Vingt années d' expérience m'ont démontré d' une manière incontestable, que le *Chlorate de Potasse,* ou *muriate* de Potasse suroxigéné, est le meilleur vulnéraire que l' on puisse administrer dans ce cas."* He then directs four *gros*† of this salt to be dissolved in about twenty-four spoonfuls of cold water, and three spoonfuls of the solution to be taken for four successive days, morning and night. Two spoonfuls is prescribed to a youth of ten years old, and a tea spoonful to an infant three times a day, morning, noon, and night. By this treatment the symptoms promptly disappear. M. Chaussier does not pretend to determine the basis of its *modus operandi,* but insists that under certain circumstances its benefit may be most decided and efficacious. In order to allay the fears, however, which some may entertain as to the danger of employing it in the quantities prescribed, he mentions, as the result of experiments made on himself, his having taken during twenty-four hours to the amount of a gros and a half of chlorate of Potassa, and that no inconvenience will be felt from it, provided none be taken on the two following days; though its influence extends to forty or fifty hours.

* Page 153.

† A *Gros* is equal to a drachm, or the eighth part of an ounce.

In the case of CROUP, so frequently fatal to children, M. Chaussier prescribes an emetic, and considers tartar emetic preferable to any other, and if the symptoms are not diminished on the following day, that is, if the cough be as frequent and violent as ever, and if there still remain the same wheezing in the breast, or the same closeness in respiration, he prescribes a second emetic—sometimes even a third, if the symptoms continue twenty-four hours afterwards with undiminished severity. When the breast is more free and respiration easier, and there appears to be a sensible amelioration, he follows it up by giving two or three times a day solution of chlorate of Potassa in water, or in some suitable diet drink: according to the age of the patient from eighteen to fifty grains of the chlorate, and continues these doses for three or four days following. Though the patient may seem entirely cured at the end of this period, Chaussier continues the use of the chlorate of Potassa, to prevent a relapse, for ten days more, but in smaller doses, and on alternate days. He considers that the chlorate of Potassa is given with most advantage during meals. Though we are hostile to tartarized antimony being given as an emetic to children, and would substitute ipecacuanha in its stead, we should certainly have great confidence in this remedy for croup, and in the case of croup in our own family, should certainly prefer it to all others with which we are acquainted. M. Chaussier observes—"J'ai donné mes soins à plusieurs enfans

attaqués du croup, et aucun n'a été victime de cette maladie si souvent meurtrière."* This assurance we have a right to believe and accept.

Having thus stated the source whence our information respecting the medical use of chlorate of Potassa has been derived, and which, strange to say, though occasionally employed by a few Medical Practitioners, according to Chaussier, has not yet found its introduction into our Pharmacopœias,—we may add, that shortly after our return from France we had occasion in our own person to put the efficacy of this medicine to the proof, in consequence of having received a serious fall, by which we voided a considerable quantity of blood. We commenced with doses of eight grains three times a day; the immediate relief obtained was remarkable, and in a few days the cure was complete. Since that period it has been used on our recommendation with great success, by a clergyman of the Church of England, who had twice ruptured a blood vessel,—and even in violent uterine hœmorrhage, a medical gentleman of Derby has employed it in his practice on our suggestion with the most beneficial effects.

Though its more direct agency seems to be connected with the circulation, it also exercises a very marked one in a torpid state of the liver, and a physician wrote us he had employed it in a case of this kind, at our special request, and that it had

* Page 177.

proved triumphant where all other remedies had constantly failed. Nor is this a solitary case of the kind, since we possess many others, but this volume was never intended to be a register or catalogue raisonnée of cases. In our own person, and in that of many others it has been found a *specific* in *cynanche tonsillaris*, from which we have been in the habit of suffering at regular periodic returns, in spring and autumn, and the only anterior relief was the lancet applied to the abscess. By the exhibition of 6 or 8 grains of the chlorate morning and evening, it has been always immediately subdued; by persisting in this for several times on its first attack, it has been banished from the system, and we have remained free these several years from its visitations. Of its efficacy in morbid glandular affections, there can therefore be no doubt. In chronic catarrh of many years standing, it has effected a complete and permanent cure. Though personally susceptible, we scarcely know, in propriâ personâ, what a permanent cough is, since we find it is soon dismissed by judicious doses of chlorate of potassa. We are not particularly attentive to quantity, but generally commence with six or eight grains, and have given it to one of our children, a few months old, in doses of two or three grains, with the most salutary effects. At our suggestion it has been made up into lozenges, and thus become a convenient mode of exhibition in catarrhal complaints.

The agency of chlorate of Potassa on the system

is very mild and gentle. It speedily reduces febrile excitement, and in a case which was supposed to be *ulcerated trachea,* two doses of eight grains each reduced the pulse from 120 to 97! The system, however, so far from being lowered, is contrariwise *strengthened*—facts which we have personally experienced as often as years have passed over us. Its effects are somewhat diuretic, at least in morbid glandular affections, and from that interesting circumstance we doubt not but its judicious administration, in combination with other medicines, might give relief in hydrothorax, and in an early stage of the disease perhaps effect a cure. We are supported analogically in this belief, from having witnessed its beneficial results in anasarca of the legs attendant on a case of Phthisis.

We shall indeed find a most decided contrast, by comparing the effects of chlorate of Potassa on the system with those of digitalis—always uncertain, sometimes even dangerous.

Foxglove, old Gerarde says, "boiled in water or wine and drunken, it doth cut and consume the thick toughness of gross and slimie flegme and naughtie humours. The same, or boiled with honied water or sugar, doth scoure and clense the brest." The Italians seem to have considered its healing powers so great that its catholicon virtues became proverbial.—"Aralda tutte le piaghe salda." Foxglove cures all wounds. Its administration requires the greatest caution, and its effects, after all, are most equivocal.

It is presumed that its specific power is subject to great variety, and we doubt not but it may suffer decomposition by age, temperature, and light. Though the leaves are chiefly relied on, the flowers are used by some—the medical virtue cannot be the same in both. At one period foxglove was prescribed by almost every one in Pulmonary Consumption. It is now regarded as useless, except in the incipient stage of tubercles—to subdue their irritation by a supposed *sedative* power. An injudicious use of it has been followed by fatality. It seems to exert some influence over the heart, and thus to subdue the power and velocity of the pulse. When the system is lowered by venesection, diuretic effects are produced by digitalis. The extreme danger consequent on its exhibition, is evident in the fact that many sudden deaths have occurred from neglecting the precaution of preserving the patient in a recumbent position while under its influence.

"Look on this picture and on that."

In the administration of both Chlorine and Nitrous Acid Gas considerable caution will be required. All metallic furniture must be discarded—even gilded surfaces will be acted on by chlorine, and coloured hangings, &c. may be bleached, especially if damp: a moist atmosphere will thus especially promote thi action. The room, therefore, whither the patient retires had better be entirely emptied of its furniture, and devoted to this exclusive purpose.

If a portion of peroxyde (or black oxyde) of manganese be put into a small basin or tea-cup, and muriatic acid (or spirit of salt) poured over it, and the ingredients mixed together be suffered to float in a vessel of tepid water, chlorine gas will be disengaged and impregnate the atmosphere: the proportionals of the peroxyde and muriatic acid must be according to the size of the apartment and the strength of the patient to bear it: thus it may be from a quarter to an ounce of the former, and two or more fluid ounces of the latter. The patient must enter this atmosphere several times a day, and each time remain a short period, so long as not to be painful or oppressive, and the quantity of impregnation must be insufficient to excite cough or irritate the lungs; two or three minutes at a time, and repeated five or six times a day, will be found quite sufficient; the physical strength and progress of the disease,—in fact circumstances and feelings must determine these points.

Connected with this part of the question we beg to quote an extract from a letter, addressed to us in 1824, by Mr. Brown, an eminent bleacher, of Mansfield, Nottinghamshire; it was written at our particular request, and arose from a conversation with the late Benjamin Hutchinson, Esq. of Southwell, whose interesting Treatise on Tic Douloureux has so deservedly rendered his name dear to medical science. At this conversation, which involved our remedial measures in Pulmonary Consumption in reference to chlorine gas, Mr. Brown was present; he stated his own case as

corroborating our views, and we in consequence requested the details:—

"Having every reason to suppose myself an asthmatic subject, and knowing what small dependance was to be placed on the then known specifics, and having frequently seen the effects of the gas on persons employed in the making of it; I determined on trying its effects on my own lungs. I should here state to you that my breathing was so very short that I could not walk up a small hill without the greatest difficulty, and felt as though a fungous substance was growing upon the lungs, indeed in every respect the same as a person I then knew, who was labouring under confirmed asthma.

"The method of taking the gas was this—I went twice a week into an open apartment, in which there was an apparatus for the manufacture of oxymuriate of lime: whilst the materials were mixing, and before the retort was luted, a quantity of the gas would escape into the room. Of this gas (of course in combination with atmospheric air) I breathed from five to ten minutes, according to the intensity of the gas, or until it produced an uneasy sensation in the chest; at first it did not operate to produce coughing immediately, but after walking about a short time I began to cough rather violently, which continued with little intermission for perhaps an hour, more or less, during which time I expectorated very freely: this violent exertion naturally produced lassitude, which

would continue the remainder of the day, but the day following, and particularly the second day after taking the gas, its salutary effects were very visible; I could breathe more freely and walk much quicker than before, and the more violent the coughing had been the better were its effects.

"Although I do not intend troubling you with the course of reasoning which induced me to try the gas, yet I will mention one circumstance which greatly encouraged me in the use of strong doses,—I have witnessed very many instances, where bleachers who were obliged to work among the gas, could not possibly prevent inhaling so much of it as to produce violent spasms; I have seen them rolling upon the ground for an hour together, and could scarcely draw breath, yet I invariably found them recover eventually, and in two or three hours the oppression on the lungs had entirely subsided. I have noticed also many of the men who have been most exposed to the action of this gas, live to a very great age, and I never knew an instance of one dying from having been seriously injured in health from the effects of the gas. I continued to breathe the gas once or twice a week, for about two months, when I found I had no further occasion for it as a medicine, as I could breathe as freely as I could wish; this may be about ten years ago, since which I have occasionally, when I found my breathing a little affected by cold or otherwise, had recourse to the gas, which never fails to produce the desired effect.

"About nine years ago, a neighbour of mine who had been gradually declining in health some months, and whose situation had become very critical, being almost without hopes from the faculty, from hearing me relate the effects of the gas on myself, felt anxious to try it. Not knowing sufficient of his complaint, or rather believing he had a complication of diseases, I reluctantly consented to his receiving it, yet as he had great difficulty in breathing and a troublesome cough, and thinking that by relieving the lungs, it might in some degree tend to restore the rest of the system, I gave him what I considered a sufficient dose for the first time: he however could not feel that he had taken the least portion, though I had breathed it in the same atmosphere, (standing beside him) until it produced cough: I therefore persuaded him to decline taking any more for the present and to walk about, which he did; he however would persist in taking a farther quantity, till I would not suffer him to breathe any more of it. It did not operate upon him during the day, (for it was taken always in the morning), nor till he had been in bed about four hours, "when he began to be warm;" he was then seized with coughing so very violently that he never expected to recover. The quantity of phlegm discharged was immense. For two or three days he felt very weak, and declared he would take no more gas; he however gradually improved from that time, got tolerably well, and is now living."

We have been accustomed to administer nitrous acid gas in Pulmonary Consumption in the following simple manner: a small quantity, to the amount of one to two ounces of red fuming nitrous acid is poured into a wide tumbler glass, and the patient sitting in the current of the vapour, in the act of escape and diffusion into the atmosphere, at about eighteen inches, more or less apart from the glass, according to circumstances, the vapour will soon be felt, and at no distant interval an evident amendment will attest its efficacy and proclaim its value. The patient may remain two or three minutes at once, and repeat the experiment four or five times a day, as may be convenient and agreeable. At the close a bladder may be put over the glass, which will retain the vapour and preserve it for further use, since the same supply may be used several times.

We have exhibited the *chlorate of Potassa* in doses of four to eight grains, two or three times a day. It is needless to add that both these exhibitions must gradually decline in frequency as the patient recovers, but we do not deem it at all necessary to particularize, because it is altogether foreign to our wish to interfere in any way with the medical practitioner, though it be an obvious and imperative duty to summon our best powers and exertions to the task of relieving suffering humanity from the painful inflictions of this insatiable disease.

As this little volume is by no means intended to be a display of cases, and a parade of medical lore, for

which we do not find that we are competent, but a selected few from an intimate friend, so it is presumed that there will be found no unnecessary parade in the announcement. We are well aware that the cases which could be adduced in our own person would be liable to much objection, and be received with jealousy, we therefore entirely avoid them. We feel, moreover, an insuperable delicacy in requesting details of cases from medical gentlemen with whom we have only had a casual or short acquaintance, notwithstanding their successful application of the remedial plan communicated to them. Besides in provincial practice, generally, the register of cases is too lax and indefinite. It is, however, now to be hoped, after it has been thus promulgated, that communications respecting its efficiency will be made to the public through the medium of the medical journals. Should the statements which follow not prove convincing, we fear that a volume of cases would be equally vain, and all argument prove unavailing. They seem substantial facts, and should the evidence adduced be refused by some, we cannot help it, not doubting that however the appeal may *now* be rejected, the facts will ultimately triumph over all hostility and opposition, nor can we forget that the greatest gifts with which suffering humanity has ever been gifted and blessed by, have been received at first either with coldness or indifference—distrust or suspicion: the legend of ages corroborates the remark, and the hostility arrayed against vaccination, and the inven-

tion of the safety lamp, are circumstances too recent to be already forgotten. We proceed, therefore, without further prefatory remarks, to quote from the communications of our friend, Richard Hughes, Esq. surgeon, of Stafford, a gentleman in extensive and eminent medical practice:—

"*Stafford, June 5th,* 1830.

"I can no longer delay to relate what poor particulars my memory will supply me with, though I fear my statements will be much too vague to make a successful stand against the incredulity with which a *remedy* for Consumption will have to contend. Having no time to digest or arrange my matter, (having but just received your letter at eleven o'clock on Saturday night) the style whereof much credits your urbanity and patience—for which I thank you—I will just relate what cases I can at this moment recollect in the order of time. First, that of the young man Pickin. That he got well you know. He remained well till the following November, when he took cold at a wake. You know his obstinacy. He resisted the efforts of his friends to induce him to inhale the gas again, though he confessed it had made him well before, consulted an itinerant physician when he had been some time ill, took from him bark, steel, Iceland moss, and hyocsyamus, gradually got worse with the usual symptoms of Consumption, and at Christmas, or the beginning of the following year, died. These particulars I gathered from his mother,

with the design of communicating them to you. I read the quack doctor's prescriptions. His sister, about a year ago, had cough, langour, debility, shortness of breath, a dull sound in part of one lung on percussion; in short, all the usual signs of incipient Phthisis, without disorder of the digestive organs. The means used were the acid gas, neutral salts, and afterwards light tonics. In about six weeks she recovered, but tells me she has since felt in the same way again, in a slight degree, and found a few days use of the gas, without any other medicine, restore her. She has been, during the three or four last months, quite well. I often see her—not professionally of course.

"Do you remember a note I wrote you about a girl, Ætat. 17, who had been troubled with a very loud spasmodic cough for many years. I informed you that the acid cured it in a fortnight, after ordinary means, applied by more than one medical man, had failed. This cough returned about a year ago or less, and was again checked entirely by the same means. I consider this cough to depend on an ulcer of the larynx.

"The young lady I took you to see at the house of the draper, and who began to use the gas and oxymur. potassa under your directions, got quite well in about six weeks. I have seen her frequently since; and only three days ago heard that she continues well. The change in her appearance is most striking. You beheld her a pale, slender, delicate

girl—her countenance apparently too pure and transparent for flesh and blood—panting on the least exertion, and working the alæ nasi at every breath—attempting to sing, and completely in character—Pope's "Vital spark." She is now plump and strong—her face bronzed by exposure to the air, her voice full and loud;—in a word, she is "in vulgar health." She warmly expressed her gratitude, when I last saw her, with wonder at the change. She said she had not known health for two years, though nothing could have made her conceive how ill she had been but present feeling of health. To assist your memory, it will be well to state, that when you saw her she had frequent short cough, febrile action, swelled ankles, and night perspirations. I do not fully recollect if she spat blood.

"It will be objected to cases like the above—when accompanied as they generally are with emenorrhœa—that the symptoms indicated neither more nor less than chlorosis. I would reply, that chlorosis is with difficulty cured by appropriate remedies. Can a disease, then, which so readily yields without these remedies, *be* chlorosis? I presume not. I have lately had a case so like the above, that it is needless to detail it—in which the young woman could only speak three or four words at a breath, and in which there was more the appearance, and even the history of chlorosis than in the former, where percussion detected engorgement of the upper part of both lungs. The gas, and some febrifuge medicine removed the

pectoral ailment, and steel and aloes have subsequently rectified the menses.

"A young married woman, not lately pregnant, and who had miscarried two or three years ago, consulted me about two months since. She had the usual symptoms of Phthisis, with evident indication of tubercular deposit, ascertained both by percussion and the stethoscope. The gas, aided by counter-irritants, sedatines, and aperients, has nearly, if not quite, restored her to health.

"I have this evening, June 8, seen the married female whose case I related in my last: she has now no pain in her chest, nor any other symptom of Phthisis. Her chest sounds well, yet there is a very slight dulness on her left side above the mammæ, —the former seat of pain.

"Mr. John Hall, of Apeton, near this place, a member of a very consumptive family, having lost a sister and a brother, the latter of whom I saw during his illness, permits me to communicate to you the following particulars, the result of our mutual reminiscence. He was attacked in the Christmas of 1828, after exposure to wet and cold, with violent pain in his chest, cough, &c.; a surgeon bled, blistered, and physicked him, and he partially recovered. In May following he came under my care, conceiving himself ill; his breathing was so bad that he could not walk two hundred yards; he was greatly emaciated, though his appetite continued good, and had pain in the right side of the chest. The indication of disease

afforded by percussion was most striking. I detected the seat of pain thereby alone. There was no other disorder than Phthisis ; no violent symptoms, yet he was evidently sinking. I immediately began with the Potassæ Oxym. and the gas. He went home much better in a fortnight, and I saw him not again at that time. In six weeks he was so well that he discontinued the use of remedies, too soon, he thinks. Soon afterwards he frequently walked six miles and back in a day, without any unusual effort or inconvenience. Toward the end of November he had an attack of Pleurisy, as before, and the early treatment was the same. He had severe pain on the left side, slight cough, but little expectoration, and inability to inspire deeply. When he came to me, a fortnight afterwards, the symptoms were mitigated, yet he had still some pain on coughing, or filling his chest, was much emaciated, and very weak. He had no night sweats ; could not count audibly more than six or seven at a breath ; chest sounded well on the left side ; the right, as formerly, gave a dull obtuse sound. Staid in Stafford a fortnight. Treatment as before. Could walk better, but began to lose breath after walking three-quarters of a mile on his way home.

" On the 10th of last February, when this account was taken, he had recovered flesh and colour. His own words follow: " Lusty as ever I was ; no cough, no pain—can walk two or three miles with pleasure,—get stronger and better every day:" the chest sounds well to seventh rib on left side—to third rib on right

side. The dulness on the right is less in degree—in intensity. His pulse was near a hundred when he first applied for relief, on both occasions; and was reduced in frequency to the natural number (seventy or eighty in a minute) before he left. His age is about forty. It will be perhaps not unimportant to introduce the case by stating that Mr. Hall applied, not to me in the first instance, but to my father, an old and able practitioner; and that my father referred him to me, knowing I wished—thanks to you—to have the treatment of cases of *Consumption*. Considering Mr. Hall's disorder to be decidedly of that hitherto hopeless kind, he smiled incredulously when I expressed my expectation of curing it.

"I this morning made inquiry of a lady in this town respecting the present state of health of her late servant, whom I had the satisfaction to treat successfully after your plan two years ago. Information that the young woman continues in perfect health had reached the lady as late as a month from this time. When under my care her age was about twenty-one years: she was pale, slender, particularly flat-chested, and stooped. Her disorder, having advanced gradually and insidiously, had almost quite disabled her before she felt the necessity of seeking medical aid. Perhaps too she was deluded by that false and fatal hope, which is almost diagnostic of Tubercular Consumption. At last her mistress insisted that she should have professional advice, having previously provided her a separate bed, lest

her breath should induce the same disease in her young fellow-servant. (I state this last particular as affording indirect evidence.) The woman, when I first saw her, had a rapid pulse, cough, humid respiration, and spoke only in a whisper. She had pain in the chest, and a very obtuse sound on striking the sternum between the upper part of the mammæ. She was compelled to move about very slowly, and could only count four or five at a breath. At the end of six weeks from this time all these alarming symptoms had subsided: she could move as quickly as she wished without distress or difficulty, and readily inspire air enough to enable her to pronounce twelve or fifteen syllables in a full voice—not a whisper as at first. In this case the nitrous acid and oxymuriate of Potassa, were (with occasional aperients) the only medicines used.

"I will relate another case, not the less interesting in that it terminated fatally; since the death was fairly attributable, like Picken's, before stated, to the disuse of that which might have prevented it, after decided benefits gained by the employment of it:—

"Mrs. Gripton, a very young married woman whom I had attended in her first labour, at a village about three miles off, and whom on that occasion I observed to be of a highly Consumptive diathesis, came to me in the spring of 1828, labouring under extreme shortness of breath, cough, and expectoration. About two months before she had taken cold while attending on her infant, then six months old: the child died, and

the mother afterwards menstruated. I forbad her to walk to Stafford again—indeed, she was not able,—and in a week or two, when antimonials and a moderate bleeding had subdued inflammation, directed her to use the nitrous fumes. She was a thoughtless woman, having no abiding consciousness of her danger, and it was with difficulty I could induce her to continue the use of the gas after the more violent symptoms had been subdued. For months I was constantly mortified to find that, when nearly well, neglect and imprudence lost her all the advantage she had gained. Still, however, improvement was evident, and in the autumn I discontinued my gratuitous attendance; leaving my patient so much better that my only ground of fear was her negligent habits. Calling on her in the spring of the following year, 1829, I was grieved to find her more ill than ever. She was again pregnant, and the old woman had persuaded her that, pregnancy being the natural cure of Consumption, she had better leave it to nature. There was much fever, great emaciation, constant cough and expectoration, diarrhæa, hectic flush,—in short, every symptom of Phthisis in its concluding stage. In July she gave birth to a six-months' child, and three days after expired."

We have, after much anxiety, and pursuing the footsteps of inductive science, brought our inquiries to a close. Many a painful reflection has the

question cost. The terrible fatality which it involved, however, so far from imparting despair, on the contrary, roused all our mental appliances; the entire succession of links in the process of this inquiry has been inductive from first to last. We have no where meddled with the question of general and auxiliary treatment, since these, subject always to much variation, can alone be judged of by the medical attendant from the symptoms as they rise in review before him.

Having studied the action of chlorine and nitrous acid gas on ulcerated wounds, and having proved their healing virtues, it seemed obvious that the only alternative that remained was their safe and judicious exhibition, through the medium of respiration to the seat of disease; for no medicine otherwise employed could be expected to act efficiently. While this was being accomplished, there seemed to be another question that required equal attention, and this was the necessity of reducing the inflammatory tendency, which might otherwise undo what had been thus accomplished. In studying the medical history of Digitalis, it seemed to us essentially wanting in that particular feature which was especially requisite. The reduction of the physical powers by a prostration of strength, seemed to us to be removing from the system the very means which would enable it successfully to combat the disease and weather the storm. From repeated experiments made on ourselves with chlorate of Potassa, we eventually discovered the very agent

which was so much the object of our search,—one that would allay febrile excitement and subdue inflammatory action, and yet leave the strength of the constitution unimpaired.

We have been brief and abrupt on the difficult question of Tubercles in the Lungs. It has been and even now is the bone of contention in medical science, and the subject of a prize at the present moment. It was enough for us to know that they were there, and required to be healed. Inflammation too has been the fruitful parent of fruitless controversy. We have taken it as most rationally explained in the researches of Dr. Phillip and Dr. Hastings, or at least that the phenomena of inflamed surfaces are best represented by these eminent individuals. Some, however, suppose it to arise from a thickened state of the fluid in the capillaries, or extreme vessels, while others impute inflammatory action to their constriction. Another opinion ascribes it to their overaction, while a fourth would have it the reverse. A fifth party, on the other hand, are of opinion that inflammation arises from an unusual flow of blood towards the part, and is thus the consequence of a *vis à tergo*. We do not presume to settle these contrarieties. While our own opinion on the important question of venesection has been partially shaded, we have introduced the conflicting testimonies of those whose extensive practice and enlightened judgment enable them to form the best opinion; and it is not difficult to see to what side the balance will prepon-

derate. We might have added many more authorities of the first stamp to our list, but such an extension of names seemed unnecessary. Dr. Burne and Dr. Stoker seem to be decidedly averse to the employment of the lancet in subduing inflammatory action; while Dr. Smith employs it without scruple in its most incipient stage, which looks very much like rebellion against Dr. Marshall Hall's *caveat.* It is asked what are we to do when inflammatory symptoms are strewn so thickly over the system? But the question is not as to the existence of inflammation, but the means of subduing it, which must be either rational or empirical. Perhaps the epithet of "Brunonian" may be attempted to be fastened on us. TRUTH, however, is and has ever been in all our inquiries, our "magnus Apollo,"

Nullius addictus jurare in verba magistri.

FINIS.

POSTSCRIPT.

HYDROPHOBIA.

It is only an act of becoming courtesy to acknowledge in this place the notice which the respectable author of the article "Hydrophobia," in the *Monthly Review* for the 1st instant, has been good enough to take of our little volume on this subject. He however overrates our ability, and expects far too much.

I. It is our duty to add that the dog exposed to an atmosphere of chlorine *was examined* after death, and that the *post mortem* appearances warranted the conclusions to which we arrived. It was therefore an inductive inference, and not a mere hypothetical dogma.

II. It seems to be deducible from observation and research that the only animals capable of *communicating* rabies are the dog, cat, fox, and wolf. The badger and the bear are more questionable. The number is thus extremely limited. We have been

accused of an omission on this part of the question; but though we did not enter into detail, it was not altogether overlooked. Thus the experiment of Majendie and Brechet is described at page 8, and we have distinctly stated in the prefatory part of the same paragraph, that the virus is the same in all, carnivorous as well as herbivorous animals, but that the latter do not appear to possess the power of communicating so readily the disease to others; and this may arise from the circumstance of their not being accustomed to bite. In the case of a number of sheep that were bitten by a rabid dog at Kingston and became mad, no symptoms of *biting* appeared, and they were seemingly incapable of communicating rabies to the rest of the flock. They butted against the other sheep and lambs, or against trees, and other objects, but inflicted no wounds.

III. As to the question of the *spontaneous* origin of Hydrophobia in the dog, cat, &c. we fear that sufficient data for the solution of the interesting problem do not yet exist. Its almost universal prevalence over the country at the present period seems to substantiate the belief that the exciting cause is epidemic, or in other words is contingent on a meteorological principle of action on animals whose constitutional structure predispose them to such excitement.

It may be well to add in this place, that our views on Hydrophobia formed part of a treatise on poisons submitted to and approved by the Committee of the Society for the Diffusion of Useful Know-

LEDGE, and the part of our MS. which embraced this topic was accidentally lost in their hands. We are not in the habit of retaining a copy of what we thus consign to paper; and as this might accidentally fall into improper hands, we felt it to be a measure of prudence and precaution to publish it *de novo* from the disjointed and very imperfect memoranda that still remained. We wished to bear our own "gashes" even under the disadvantages described, and which will readily be accepted as apologetic for any omissions or imperfect details, as well as our inability to be specific in describing the *post mortem* appearances, the want of which has been complained of, esteeming it the wiser measure to wave details altogether than trust to memory for them.

We are very sensible that our treatise is by no means complete. We shall however supply many desiderata in our "Natural History of Poisons," though it is by no means our intention to recapitulate what has already been embraced in our little volume, of which only 150 copies were printed, and more than one-third of these were gratuitously distributed. The volume was written *prior* to the present alarm, though it appears to have been singularly opportune. Our wish was to elicit inquiry, and though some are of a different opinion, we consider the present excitement, which we sincerely trust will not, from any false delicacy and feeling, be repressed, as eventually fraught with some discovery which may be both a specific preventive and a specific cure. It has roused attention to a subject pronounced

incurable, and still remaining a stigma on medical science, and has been the means of concentrating on this point the collected intellect of a multitude of minds.

We feel confident that an atmosphere of chlorine cautiously breathed, and the external application of the same gas to the surface of the body in an envelope of oiled silk, with the internal administration of frequent doses of eight to twelve grains each of chlorate of potassa, would triumph over the most formidable assailant that the constitution has to grapple with. Our experiment has wrought this conviction.

We perceive that the *veratrum sebadilla* has since been tried, and the result such as we anticipated and expressed, though the adjunct of the "soaked rennet" has very properly been dispensed with. It is a duty to unmask every proposition which may induce a false confidence; the most extraordinary example of this kind is contained in a recent number of the "Examiner" newspaper, and is neither more nor less than an omelette of egg and oil!

Let it never be forgotten that *excision,* even within half an hour of the infliction of the wound, has been found unavailing, and that other preventives should be conjoined with it. In no case whatever can it be proved that the *actual cautery* has acted as a preventive—all Trolliet's patients were thus treated, and —all died. *Caustics* seem to us altogether useless: they may accelerate the absorption of the virus, but do not *decompose* it; if in solution, their mischief is more apparent.

Notwithstanding the high authority of Mr. Youatt, we should have no confidence in lunar caustic, since we cannot see that nitrate of silver can decompose the rabid poison. The wounds of the boy READ were treated with nitrate of silver yet he perished of Hydrophobia! A prophylactic, to be efficient, should either possess the power of *preventing the absorption of the poison*, or of *decomposing* it. Nitric or nitromuriatic acid, or chlorine, are the only agents likely to effect the last most important desideratum.

In our remarks we recommended suction of the wound, and advocated the measure as void of danger. The following interesting fact may be added to our analogies:—One of the Moravian Missionaries among the Nicobar Islands, on locking his door at night, felt as if a splinter had entered the finger. He instinctively sucked it through the entire night. The following day his arm had swollen considerably, but he felt no other inconvenience. It was afterwards found that a small serpent, of the most venomous and deadly kind, had at the moment been making its way through the key-hole, in which position it was found the following morning; and after having inflicted a wound, always fatal except in this instance, had been crushed to death by the turning of the key. Bosquillon tells us of certain individuals in some countries who boldly suck the wounds inflicted by a rabid animal, without danger. Fothergill recommended it, though Andry considers it dangerous, and blames those who advise it.

In the interesting experiments of Dr. Hertwich on rabid dogs, in the Journal of Groufe and Walther, as cited in Mr. Brande's Journal of the 1st instant, we find it expressly stated, that of twenty-two dogs which were made to swallow the virus of rabies, *not one took the disease;* and in the London *Courier* of the 29th June, there is a communication under the signature K., of the successful suction of the wound inflicted by a mad dog. We rejoice to find that our views are thus confirmed by repeated facts. The entire experiments of Hertwich corroborate and confirm in a remarkable manner the views of the pathology of the disease, and its nature, which it has been our object to sustain.

20*th July*, 1830.

ERRATUM.

"Remarks on Hydrophobia," page 49, for *vulnueus*, read *vulneris*.

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